BIENNIAL REPORT
OF THE
BOARD OF HORTICULTURE
OF THE
STATE OF OREGON
1906-1908

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TENTH BIENNIAL REPORT

OF THE

BOARD OF HORTICULTURE

TO THE

TWENTY-FIFTH LEGISLATIVE ASSEMBLY

OF THE

STATE OF OREGON

1909

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SALEM, OREGON
WILLIS S. DUNIWAY, STATE PRINTER
1908

LETTER OF TRANSMITTAL.

GASTON, OREGON, January 1, 1909.

To the Honorable, the Legislative Assembly of Oregon:

Gentlemen: In conformity with the statute which directs the Board of Horticulture to report biennially to you, I herewith submit my report of the work of the Board for the years 1907 and 1908.

You are, of course, familiar in a general way with the object of the Board and with the work that has been accomplished, and I need refer to that only briefly, but I hope in a way that will show its importance As originally organized, the district commissioners, five in number, were the active working force, the president being merely a figure-head who presided at meetings. Later the president was made an active working member and in 1905 the present organization was perfected; the work of the Board being supplemented by a force of county inspectors.

We have now a very efficient working force, having been extremely fortunate in securing the services of some of the best fruit growers in the state as county inspectors. Without any desire to boast, but merely for your correct information, I wish to call your attention to the condition of the fruit industry in the State, past and present. The United States and State census figures show for many years prior to the year 1900, a steady decline in the value of the fruit crop in Oregon. This condition was due to the tremendous increase of insect pests and fungous diseases and the lack of knowledge or incentive to fight them. There was an over-supply of fruit for home use and the condition of the fruit prevented its being marketed abroad, hence the industry languished. Since the year 1900 the value of the crop has steadily grown, increasing from one million, three hundred thousand dollars in that year to over four million dollars at the present time.

While, of course, not being so egotistical as to claim all the credit for this, it is only fair to say that without the machinery of such an organization as the State Board of Horticulture, it would have been impossible to have accomplished it. A fact not generally recognized is that the fruit industry, unlike many others, must depend very largely upon a market outside of the State. Without a high standard, and the means of attaining and enforcing such standard, it would be impossible to reach these outside markets and the industry could not enlarge. As it is now, a very large per cent of the crop goes

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outside of the State, bringing absolutely new money in return. Oregon apples and pears are now unquestionably the most famous in the world, and it must be our constant aim to keep them so, that we may continue to find remunerative markets for the vastly increased crops of the near future.

Since the addition of the county inspectors to our force the scope of the work has been enlarged, and the duties of the commissioners have changed somewhat. The county inspectors are paid by the counties, but work under the direct supervision of their respective commissioners. The commissioners are kept busy training and drilling the inspectors in their work, traveling here and there to attend meetings, or to settle appeals in disputed cases, to gather information and statistics, and to look after the inspection of nurseries. The field of work is so vast that the only limit is the time and money available.

The commissioner-at-large is directed by the law to visit annually each of the fruit-growing districts of the State. With the funds available this is manifestly impossible, but I have endeavored to visit just as many as possible, the more important ones of course, first. In view of the constantly increasing work, and of its importance, it becomes necessary at this time for us to ask a small increase in the biennial appropriation for our use. The amount appropriated has never been increased since the board was organized, while the work has increased four fold.

The appended semi-annual reports of the commissioners and of the secretary show in detail the work that has been done, and how the funds have been expended, and I respectfully call your attention to them for fuller details.

Respectfully submitted, W. K. NEWELL,
Commissioner at Large and President of the Board.

OFFICERS OF THE BOARD

W. K. NEWELL - - - - - - - - - - - PRESIDENT
R. H. WEBER - - - - - - - - - - - TREASURER
H. M. WILLIAMSON - - - - - - - - - SECRETARY

OFFICE: PORTLAND, OREGON.

BOARD OF COMMISSIONERS

STATE AT LARGE
W. K. NEWELL - - - - - - - - - - - GASTON

FIRST DISTRICT
M. O. LOWNSDALE - - - - - - - - - - LA FAYETTE

SECOND DISTRICT
CHAS. A. PARK - - - - - - - - - - - SALEM

THIRD DISTRICT
A. H. CARSON - - - - - - - - - - GRANTS PASS

FOURTH DISTRICT
R. H. WEBER - - - - - - - - - - THE DALLES

FIFTH DISTRICT
JUDD GEER - - - - - - - - - - - COVE

DISTRICT BOUNDARIES

FIRST DISTRICT

Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook counties

SECOND DISTRICT

Lincoln, Marion, Polk, Benton, Linn, and Lane counties

THIRD DISTRICT

Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake counties

FOURTH DISTRICT

Morrow, Wasco, Gilliam, Hood River, Crook, Sherman and Wheeler counties

FIFTH DISTRICT

Umatilla, Union, Baker, Wallowa, Malheur, Grant, and Harney counties

COUNTY FRUIT INSPECTORS

Baker—
Benton—H. L. French, Corvallis.
Clackamas—A. J. Lewis, R. F. D. No. 3, Oregon City.
Clatsop—Chas. S. Dow, Astoria.
Columbia—J. A. Holaday, Deer Island.
Coos—
Crook—
Curry—
Douglas—Geo. W. Riddle, Riddle, Or.
Gilliam—T. C. Mobley, Olex.
Grant—
Harney—Hugh Harris, Burns.
Hood River—G. R. Castner, Hood River.
Jackson—Geo. W. Taylor, Medford.
Josephine—H. C. Batcham, Grants Pass.
Klamath—J. O. Stearns, Klamath Falls.
Lake—A. M. Smith, New Pine Creek.
Lane—J. Beebe, Eugene.
Lincoln—S. G. Irwin, Newport.
Linn—E. W. Cooper, Albany.
Malheur—E. B. Conklin, Ontario.
Morrow—
Marion—E. C. Armstrong, Salem.
Multnomah—Leon S. Baum, Portland.
Polk—Ross Nelson, Independence.
Sherman—A. P. Altermatt, Rufus.
Tillamook—
Umatilla—T. L. Ragsdale, Freewater
Union — Garret Oldenburg, La Grande.
Wallowa—
Wasco—J. P. Carroll, Mosier.
Washington—W. R. Harris, Forest Grove.
Wheeler—
Yamhill—C. E. Newhouse, Newberg.

YELLOW NEWTOWN APPLE TREES AS THEY GROW IN OREGON.
Scene in the Marshall Orchard near Medford, Oregon, 1908. This is part of the famous old Stewart Orchard.

REPORTS OF W. K. NEWELL,

President of Board and Commissioner at Large.

APRIL MEETING, 1907

GASTON, OREGON. March 30, 1907.

To the Honorable State Board of Horticulture:

That the horticultural industry of Oregon is growing very rapidly is patent to the most casual observer. New plantings of all kinds of fruits are being made on every hand, and never before was there such activity in pruning and spraying as has been seen this winter.

Horticultural societies have been formed in nearly every fruit growing locality and have been very active in stirring up interest in the work. Several of these societies are contemplating the organizing of co-operative packing houses in localities where such do not now exist.

Several new canneries will be established this year; plants at Albany, Eugene, Brownsville, Monmouth, Milton-Freewater and La Grande are already decided upon. There is fruit enough in these localities to warrant starting canneries, and if they are properly supported by the growers supplying them, with increased quantities of good fruit as their market demands increase, they will no doubt succeed. As has been so often said through the columns of the *Rural Northwest,* there is no use expecting to run a cannery on "surplus" fruit alone. A steady and abundant supply must be assured. Although, of course, a cannery cannot pay high market prices at all times for fruit, I firmly believe that they can pay prices that will be very profitable to the grower, taking into consideration the assured market and the lessened expense of boxing and packing. The co-operative cannery at Springbrook, a model of its kind, in which nearly every fruit grower of the community is a stockholder, has paid remunerative prices to the growers for their fruit, and as stockholders they have taken out neat dividends as well.

As an evidence of what a cannery can do, the Pacific Coast Syrup Company, of San Francisco, operating a cannery at Seattle, has contracted for this year with the Sumner Valley Fruit Growers' Association for their entire crop of raspberries, estimated at 35,000 crates. Certainly the price must be a satisfactory one, as these people have been making big money selling their berries fresh on the market. There is a great shortage in all kinds of canned fruits, particularly cherries, strawberries and raspberries. Gooseberries and currants are

also in demand for jams and jellies. No one can make any mistake by planting heavily of any of these kinds of fruits. A good and safe way is to contract in advance if possible to some cannery for a term of years for say half to two-thirds of the prospective crop at a fixed price, and then take the chances on the market with the remainder. There is always the probability of high prices for part of the crop, and there is an assured price to fall back on if the market fails.

I would particularly urge the planting of cherries—Royal Ann cherries for the canncry. While there are two serious difficulties in the way, the gummosis of the tree and the cracking of the fruit in the rain, still I believe these difficulties can be overcome sufficiently to make the business very successful. Careful observation leads to the belief that cherries top-worked in resistant stock and planted on very well drained soil, particularly high hill sides where there is rock or gravel near the surface, and kept carefully sprayed from their youth up, can be brought to maturity with but small loss from gummosis.

At harvest time, if weather is threatening, great care will be required in picking. A Royal Ann cherry is fit to can, though, of course, not at its best, before it is ripe enough to crack in the rain. If a sufficient force of pickers can be secured to keep them picked very closely, the loss from cracking can be kept at a minimum.

Horticultural conditions in the Eastern States, particularly New York, Pennsylvania and Maryland, are of great interest to us at this time. Scale and other insect pests are increasing alarmingly there, and with their very large, high-headed trees, it is almost impossible to keep this pest in check. While I am sure there is no tendency to rejoice at their misfortune, still we cannot help but see that we will profit by it. The growing demand for fruit must be supplied. Orchards can be brought into bearing here quicker than on the Atlantic Coast, and while they are getting readjusted there, and working round to the idea that they must plant new orchards, we can have our fruit in their market, establishing a reputation.

I wish to call your attention to the law passed at the last session of the legislature compelling the branding of all packages of fruit offered for sale, with the growers' and packers' name and address. When the packer is other than the grower the package must contain both names. This will prevent any stealing of one community's reputation by another, and will render it very easy for our inspector to trace diseased, wormy or scaly fruit to its source. It is a good law and must be strictly enforced.

W. K. NEWELL,
Commissioner at Large.

TAKEN BY THE BOARD CAMERA IN THE PACKING HOUSE OF THE MEDFORD FRUIT GROWERS' UNION.

OCTOBER MEETING, 1907

GASTON, OREGON, September 30, 1907.

To the Honorable State Board of Horticulture:

This has been a prosperous and successful year for the fruit growers in nearly all lines. Although yields in some varieties have been light, never before in the history of the industry have prices ruled so high on such large quantities of fruit.

When the report of the Hood River Apple Growers' Union's apples was made public, it seemed the highest possible mark for prices had been reached. A price of $2.75 for Newtowns and $3.27½ for fanciest Spitzenburghs seemed almost beyond belief, but when there is added to this the report of sales of Bartlett pears from Rogue River in New York and Boston at $4.80 and $5 per box, and of one carload of Comice pears from Medford selling in New York for $4,622.80, or an average of $3.99½ per half box, and of a car of Comice pears shipped from Salem selling at $3.70 per half box, it is hard to realize. Think of it; pears selling at 10 cents per pear wholesale.

The following figures are submitted as a safe and conservative estimate of the amount and value of this year's fruit crop for the state. The figures are compiled from the reports sent in by the county inspectors and others in a position to judge and have been checked up by comparison with former yields, as well as by personal observation of the growing crop in nearly all parts of the state, and are believed to be approximately correct:

VALUE OF 1907 FRUIT CROP.

Apples, boxes, 1,082,200	$1,423,800
Dried prunes, pounds, 25,450,000	1,208,875
Prunes and plums shipped green or sold fresh to canners and others, tons, 4185	90,650
Pears, boxes, 247,760	286,600
Peaches, boxes, 445,870	248,260
Cherries, pounds, 5,459,000	230,500
Apricots, boxes, 9500	7,500
Strawberries, pounds, 6,980,000	407,500
Blackberries, pounds, 2,150,000	79,500
Raspberries, pounds, 1,450,000	74,500
Loganberries, pounds, 1,140,000	33,500
Currants, pounds, 370,000	21,000
Gooseberries, pounds, 375,000	12,500
Grapes, pounds, 3,945,000	124,500
Other fruits	26,000
Total value	$4,275,185

The estimated value of the crop of dried prunes after being packed ready for shipment is $1,590,625.

It will be seen that the total value is far in excess of that of any previous year. The figures included in making up the total are not dealers' prices, but the amounts paid to growers, and show a very satisfactory increase of 53 per cent over the value of the crop of 1906.

The heavy plantings of the past few years are commencing to bear and the increase in the value of the crop will be very rapid in the near future.

The phenomenal prices received this year for the fancy fruit will prove the most effective of advertising, and will spread our fame still more widely over the land and will increase the demand. The Pacific Coast is the natural fruit garden of the country, and we have advantages of soil and climate unsurpassed by any other section, and it only remains for us to maintain our present high standard of product to step into the front rank and in a short time make fruit growing the greatest source of wealth in the State.

COUNTY FRUIT INSPECTORS.

The careful and efficient work of our county fruit inspectors has been a great source of satisfaction. By a personal demonstration where needed they have shown people how to spray, and then protected them by preventing the sale of infected fruit. As an example I call attention to what has been accomplished in the Freewater-Milton district. Two years ago the fruit there was so scaly and wormy as to be almost unmarketable, but a united, determined effort among the growers, led by Inspector Evans, has this year produced over one hundred thousand dollars' worth of clean, sound apples, pears, prunes and peaches. The growers know now that they can control pests, and the industry in that locality is saved. Equally good results have been accomplished in other counties. The work of the inspectors should be enlarged as the industry grows. Our larger counties should now put their men on salaries and let them devote all their time to the work. Let them be instructors and advisers, traveling to every farm and talking and working personally with every man. That is the kind of work that brings results. I hope you will, each of you, urge this upon your growers and your county courts.

Another thing that should be made part of the regular duty of the county inspector is the gathering of statistics, particularly of the yield of fruit. They should each be provided with the proper blanks and be instructed to gather the figures of yields and values of each crop as it is ready to market.

SPRAYING AND SPRAYS.

From some localities reports have come of poor results from spraying this year. The use of the ready-prepared lime and sulphur spray was almost universal last winter, and the investigations of Professor A. B. Cordley and others lead to the conclusion that there was a great variation in the strength of the sprays put upon the market, and that in many cases it was diluted too much. It is difficult to make this spray always of the same strength; hence the Niagara Spray people propose this year to test each vat separately and label the barrel with the actual strength of that lot, and state how much it should be diluted. Growers should be careful to demand a guarantee of actual strength before purchasing.

Again I would urge the importance of beginning the winter

A Side Issue Crop on Fruit Farm of W. K. Newell, Gaston, Oregon, 1908.

spraying early. In the fall the San Jose scales that are to winter over on the trees are not nearly so well protected as they are in the spring, and they can be killed with greater ease. Then, where anthracnose or dead spot of the apple is prevalent it is absolutely necessary to spray early to do any good. Begin to spray just as soon as the leaves begin to fall.

A notable example of effect of spraying occurred at Beaverton. Mr. Anderson at that place has one large tree near his house, with one limb projecting over the house so that it was not sprayed during the summer. From the balance of the tree which was sprayed he gathered ten boxes of apples, of which only ten were wormy. From the one limb that was not sprayed, one box was picked and every apple was wormy.

FRUIT CANNERIES.

More progress has been made in the canning industry this year than in all the previous years in the history of the State put together. There was a good crop of nearly all kinds of small fruits and a magnificent crop of pears and cherries for the canneries to work on, and prices of canned goods are very high, so every cannery was run to capacity. Fair prices were paid to growers. New canneries have been started at Brownsville, Newberg, Freewater, Myrtle Creek and Grants Pass, and other new ones are assured at Portland, Eugene, Monmouth and other places for the coming season. There is no question but that the canning industry will assume large proportions in the near future. There is room for one in every good-sized town if only the growers round about that town will provide the fruit and vegetables. Canneries can not be successfully run unless there is a good supply of fruit assured. Canned apples should become one of Oregon's specialties, and the market for Bartlett pears and Royal Ann cherries can not be supplied. That we may derive full credit cannerymen should be compelled by law to label all their pack as Oregon fruit.

LOGANBERRIES.

The acreage of loganberries has increased so rapidly this year the market was temporarily over-supplied. However, consumption will increase rapidly as this splendid berry becomes better known. The Weber-Bussell Canning Company say they will can all the loganberries that are offered them next year. Also, I am convinced there will be a splendid market for this berry in the evaporated state. The Dayton Evaporating Company this year dried quite a quantity of them. They dry in about the same time as Italian prunes and make about one pound of dry fruit to six pounds of fresh. Samples of the dried berries were sent to a number of Eastern dealers and brought very favorable replies. The Eastern trade wants something of the kind for pie timber; heretofore they have depended on New York evaporated black cap raspberries, but of late blight has ruined many large

patches of these berries in New York and they are forced to look elsewhere for a substitute. Loganberries yield so enormously that it is believed they can be grown and dried profitably at a very reasonable price.

GRAPES.

The production of grapes is increasing very rapidly also. Oregon now grows her own supply of Concords and some for export, having shut the Eastern Concords out of this market some years ago. The time will soon come when European varieties of grapes grown at The Dalles and Grants Pass will shut the California grapes out of this market during the season for the home product.

We need a grape juice factory to care for the surplus of Concords. They can be grown in unlimited supply if only the market is assured.

THE LABOR QUESTION.

The labor question seems to be a serious one to the fruit grower, as it is to everyone who employs labor. Many fruit growers advocate free importation of Asiatic laborers, but it seems to me that this is unwise. Experience has proven that it will surely cause trouble with white laboring men, and it is to the latter that the fruit grower must look for his market in a large degree. The Asiatic is not such a good helper as we are wont to imagine—now that we can not get him. Any bright American girl or woman will pack more apples in a day, and do it better, than any Japanese man that ever came here. I have had one white man pick up as many prunes in a day as two Japanese men working side by side—the white man at $2 per day and the Japanese at $1.75 each.

The problem for us is how we may better utilize the labor we have. Let the Asiatic, be he Japanese, Chinese or Hindu, stay at home. The donkey engine and dynamite must be used to clear the land, and labor-saving machinery replace human hands to the fullest extent. Very large, individual plantings of fruit should be avoided as unprofitable alike to the community and the holder. Plantings should include a long succession of fruits, so that the work may be as nearly steady as possible; then if the community will not supply all the help needed at harvest time, the fruit grower should do as the hop grower does, arrange for families to come and camp. Provide a pleasant camp ground, wood and water, and pay by the piece liberally so that the industrious worker may make a little more than the usual daily wage. With all the cry for help we still have a wealth of labor in our cities, towns and villages that is not utilized, and that would be vastly benefited by a summer's outing in the berry patches and orchard. With the extension of electric lines great numbers of people can go into the country to work by the day, as well as from the suburbs of the cities.

W. K. NEWELL,
Commissioner at Large.

"Beautiful Cove," in the Grande Ronde Valley.
One of Oregon's noted cherry-growing districts.

APRIL MEETING, 1908

GASTON, OREGON, March 31, 1908.

To the Honorable State Board of Horticulture:

At the present writing Nature seems to be doing her best to insure the fruit grower a bountiful crop. Weather conditions are very favorable, and unless some abnormal change occurs, all well-cared-for trees and plants should set a full crop. The element of chance will then be largely removed and the result will depend upon the skill and care of the grower. I am glad to say that the growers are as a rule very much better prepared to give this care than ever before. The profitable crops of the past few years have enabled growers to equip themselves with proper apparatus, and the awakened interest all along the line has resulted in increased knowledge, and determination to succeed.

Very large areas of all kinds of fruits have been set out during the season, and the increase of production will be immense in a very few years. In the Rogue River Valley around Medford apples and pears comprise the principal plantings; apples at Hood River and in the Grande Ronde Valley. One of the very noticeable things is the great number of Tokay and other European grapes being planted around Grants Pass, where the success of Commissioner Carson in this line has been the stimulating cause. The Umpqua country is increasing its acreage of all kinds of fruits, especially peaches.

In the Willamette Valley the striking increase is in cherry and walnut planting, and of small fruits for canning purposes. The erection of five canning plants in the State last year and the assurance of several more the coming season have greatly stimulated interest in that line, and there is no doubt that the near future will see us rivaling California in that line.

In Eastern Oregon great quantities of peaches, apricots and cherries have been planted around The Dalles, and a new fruit region of great promise is being developed on the irrigated lands of Umatilla County around Hermiston, Echo and Irrigon.

A larger number of fruit growers' meetings have been held in various parts of the State this past winter than ever before, and certainly considerable good has been accomplished thereby.

The 1907 edition of our Board Report was long since exhausted and Secretary Williamson estimates that he has received nearly one thousand requests for copies that he has been unable to fill. This shows conclusively the need of such a volume and emphasizes the necessity of our using great care in its preparation.

W. K. NEWELL,
Commissioner at Large.

OCTOBER MEETING, 1908

To the Honorable State Board of Horticulture:

As is customary at this time, my report will show the quantities of fruit produced in the entire State during the present year and the aggregate values, as nearly as they can be ascertained. Also, such observations and suggestions as seem pertinent to our work at this time. The yield and the values are as follows:

	Value.
Apples, 1,300,000 boxes	$1,225,000
Pears, 272,000 boxes	135,000
Peaches, 600,000 boxes	300,000
Cherries, 4,950,000 pounds	165,000
Plums and fresh prunes, 5,120,000 pounds	95,000
Apricots, 12,000 boxes	9,000
Dried prunes, 15,700,000 pounds	785,000
Grapes, 2,500,000 pounds	76,600
Strawberries, 8,900,000 pounds	375,000
Blackberries, 2,400,000 pounds	76,000
Raspberries, 1,750,000 pounds	75,000
Loganberries, 1,850,000 pounds	40,000
Currants, 425,000 pounds	22,000
Gooseberries, 400,000 pounds	15,000
Other fruits	30,000
Walnuts, almonds and filberts, 150,000 pounds	20,000
Total value	$3,443,600

The peach crop of the Rogue River Valley, particularly around Ashland, was very large, as in fact it was all over the State, but the apple and pear crops were light in that district, partly owing to the enormous crop of last year and partly to unfavorable weather conditions in the spring. In this connection I wish to call your attention to the success attained in the Gore orchard at Medford in building fires to prevent frost damage. In this orchard a large number of fires were built early each morning when frost threatened, with the result that the orchard bore a very heavy crop of pears, being the only one so heavily loaded in the valley. Many other orchardists will make arrangements for similar treatment next spring. There is a controversy over the relative efficiency of the smoke (smudge) system and that of heating the air with open fires. Both methods will be fully tried out next season should there be occasion for their use.

The dried prune crop of the state is but little over one-half of the crop of last year, according to the best estimate which can be made at this time. The bulk of this season's crop of dried prunes has been sold at 5 cents per pound for the 40-50 size, a fair price in view of present conditions.

There has been a very notable increase in the production of all kinds of fruit in the Milton and Freewater district, and the newly irrigated lands in western Umatilla County are beginning to make a showing. Production here will certainly increase with leaps and bounds.

Gen. Goodrod's Orchard Home, "By the Lake," Union, Oregon.

As was to be expected, owing to financial conditions, prices have not ruled as high as during last season, though at all times fairly remunerative and at many times very good indeed. For a time it seemed as though apple prices must be low, owing to an apparent determination on the part of the Eastern buyer not to buy but to attempt to force consignments. But one New York dealer, more enterprising than the rest, broke in and bought heavily, since which others have followed suit and many large sales have been made at good prices. No difficulty is anticipated now in marketing the entire crop to good advantage. Growers should take great care, however, to pack nothing but good fruit; send the culls to the cider mill or the pig trough. Too many second grade peaches were put on the market this season.

Cherries were discouragingly low in price owing to the hesitancy of the cannerymen to buy as freely as usual. The Lane County Fruit Growers' Union, with commendable business sagacity, hired the local canneryman to put up their crop for them. Later they were able to sell at a price which leaves them a fair profit on what otherwise would have been certain loss. Quite large quantities of cherries were dried also. Whenever prices are unsatisfactory for the fresh fruit they can be handled in this way and some profit made on the crop. There is no reason for cherry growers to become discouraged.

An interesting feature of a trip to the Grande Ronde Valley was to find at Cove, on August 31, cherries still being picked for shipment fresh and for drying, and the next day at La Grande, twenty miles across the valley, picking second-crop Clarke strawberries beautifully ripened and in sufficient quantity to warrant picking for market.

Each year shows an improvement in spraying methods and better results obtained. In the leading apple and pear growing districts the codling moth is becoming so reduced in number that it seems possible it may in time be exterminated. It is already safe to reduce somewhat the number of sprayings in these localities.

Apple tree anthracnose still continues to be a serious disease and must be fought diligently by spraying thoroughly each year as soon as possible after the crop is gathered, with a strong bordeaux mixture. In an orchard treated by Professor Cordley, where this disease was very bad three years ago, careful search this fall fails to show any new disease spots whatever.

The lime-sulphur spray was used quite extensively last spring for treatment of scab. Owing to the very peculiar weather conditions which rendered the foliage very tender at that time, and also to the fact that it is difficult to test exactly the strength of the diluted spray, some injury was done to the foliage by the early sprays. But in very few instances was there any real damage done, and certainly much good was accomplished in controlling the scab. Our new spray bulletin will contain directions for more carefully testing this spray, and its use can be continued with good results.

The law contemplates that the commissioner at large shall visit each fruit-growing section of the State each year. With the funds at our disposal this is manifestly impossible, and the best I have been able to do is to visit the main districts each year and one or two new localities each season. In pursuance of this plan, accompanied by Commissioner Carson of the Third District, I visited the Lower Umpqua Valley and Coos Bay regions in June. Although knowing something of the progress being made in that district from the reports received and from the fruits exhibited from time to time, I was greatly surprised at the actual results achieved and at the possibilities for the future. The heavily timbered soils, like many other portions of Oregon, are difficult and expensive to clear, but when once subdued they are of unsurpassed fertility, and will produce nearly all the fruits of the temperate zone to perfection. The small fruits, particularly raspberries and blackberries, yield astonishing quantities of fruit of the most superb quality. The Gravenstein apples of this region have already become famous for their size, flavor and shipping qualities. Many other varieties will do equally well. Being near the sea coast, the bright red apples will perhaps not color so highly as elsewhere, and fungous diseases will be difficult to control, but these troubles are offset by the pleasant fact that the codling moth is unknown, and the heavy expense of spraying for it can be avoided.

The prune industry is today on a sound basis in Oregon, and is capable of large expansion. Given proper soil and site, and intelligent care, the prune is certain to pay a reasonable profit and the prune orchard to be a profitable investment.

The man who would plant an orchard in Oregon today has many advantages over the one who began twenty or more years ago, or even ten years ago. The mistakes which have been made can be seen and avoided; he knows now what varieties to plant; how far apart to set the trees; how to select the soil; how to prune and cultivate; in short, the trail has been thoroughly blazed. The temptation to plant more orchards is hard to resist.

In spite of all the preachments for years about cover crops for orchards, it is astonishing to find how few orchardists use them. It is true that twice as many can be seen this fall as in any previous year, still the number is astonishingly small. Intense cultivation all summer for an orchard without a following winter crop of vetches is even harder on the soil than the old bare summer fallow for wheat, and it is time we realized the absolute necessity of the winter cover crop for the orchard.

Few of us realize how much income may be obtained from a very few acres, and for the encouragement of those who have small tracts of land I wish to give the figures of actual production of fruit on the small suburban tract of Mr. Albert Johnson at Ashland, Oregon. These figures are taken from the books of the Ashland Fruit Growers'

Picking Bartlett Pears.
Orchard of A. Johnson, Ashland, Oregon.

Association, and do not include what was consumed at home, nor that sold to neighbors. The amount of land was five acres less that cut off by two streets and that used for barn, house and a good-sized lawn, or about four acres net for growing crops of fruit and vegetables:

4000 boxes of peaches,
40 boxes of apples,
86 boxes of pears,
26 20-lb. boxes of summer apples,
19 20-lb. boxes of Seckel pears,
846 lbs. green peas,
183 15-box crates of strawberries,
2 crates of gooseberries,
5 ½ crates of pie cherries,
6 crates of May Duke cherries,
13 20-lb. boxes of Royal Ann cherries,
12 20-lb. boxes of Lambert cherries,
8 20-lb. boxes of Black Republican cherries,
20 20-lb. boxes of apricots,
20 20-lb. boxes of plums,
132 20-lb. boxes of nectarines,
275 crates of loganberries,
38 crates of currants,
10 20-lb. boxes miscellaneous cherries,
9 20-lb. boxes prunes,
98 crates of blackberries.

W. K. NEWELL,
Commissioner at Large.

REPORTS OF HON. J. H. REID,

Commissioner for First District

APRIL MEETING, 1907

MILWAUKIE, OREGON, March 30, 1907.

To the Honorable State Board of Horticulture:

All over the district there has been a great increase in the planting of trees. Especially is this so in the case of apples. There has been a remarkable planting of apple trees, in five to twenty-acre tracts. More Spitzenburghs are being planted than any other variety, although quite a number of Baldwins, Jonathans and Kings have been set out. The outlook for the apple crop this year is better than ever. Very few pears or peaches have been planted. There have been a few large plantings of cherries. I would advise all those who intend to set out cherry orchards to plant Royal Anns on hill land; Lamberts in the valleys. The Lambert bears for us every year; the Royal Ann bears a full crop only every second or third year. Considerable interest is being displayed in the walnut industry and several large plantings of forty or fifty-acre tracts have been made.

"Everybody sprays" is the slogan of the fruit grower now. As you know, we won the "Sellwood case" at Oregon City, so now we can all go right ahead and, without any fear of damage suits, enforce the spraying laws to the limit, knowing that we have ample authority to do so, and knowing that we have the decision of the court to back us up. More than one-half of the trees in this district have been sprayed already, quite a number of the old scaly orchards have been grubbed out; and if the rest of them are not sprayed and attended to right away, something will happen to them, too.

There are some orchardists who do not as yet fully understand the mixing and cooking of spray material. This often causes loss of time and money, as sometimes the spray is made too weak—and thus worthless, and sometimes it is made too strong and destroys the fruit or foliage. To correct this I advise every orchardist to supply himself with a Baume acid spindle for heavy liquids. With this he can test his spray material and be sure that it is of the right strength before he puts it on the trees. The spray should test 5½ per cent on the scale when ready for use. I recommend that in our next spray bulletin we explain the use of this Baume test. Last summer I sprayed a few pear trees with lime and sulphur

solution at about 1 per cent spindle test. I sprayed right after the blossoms fell, and as a result my pears were free from fungus. I will try my trees again this year with materials of different strength and note the results of my experiments.

Whenever posible it is best to make one's own spray material. Our 50-50-150 lime and sulphur solution shows nearly 2 per cent stronger spindle test than the ready-made article.

In regard to small fruit, there is quite a large acreage in this district and there would be much more if the growers could contract with the cannerymen at a reasonable price. The canneries here do not begin to pay the price for small fruit or cherries that they do in California. We want more canneries here, but we want canneries that will not only use second-grade fruit but also give us a good price for first-grade fruit and put it up in fancy packages. There is a fine opening here for just that kind of a business.

The "Superlative," a new addition to our list of raspberry plants, seems to be doing all that its originators claim for it. It is better than any other raspberry now on the market, and unless some other still newer and better berry is introduced it will eventually drive other varieties from the market.

Many Magoon, Oregon and Clark Seedling strawberries have been set out. There are not nearly enough gooseberries or currants raised here to supply even the local markets.

JAS. H. REID,
Commissioner First District.

APRIL MEETING, 1908

MILWAUKIE, OREGON, March 31, 1908.

To the Honorable State Board of Horticulture:

The increase in spraying for scale in my district has been fully 40 per cent over last year. Lime and sulphur is the principal spray used, although a few have experimented with sheep-dip. The method of applying in small orchards has been hand-power. In the larger orchards, gasoline engines and a few compressed air outfits are used. Gasoline engines give the best satisfaction because you have a continuous, steady pressure all the time. It is my idea the spraying machine of the future will be a compressed-air sprayer with a small gasoline engine that will weigh about a hundred and fifty pounds and an air pump not to exceed fifty pounds. These will be carried on the spray wagon and then you will have a continuous, steady pressure instead of a hundred and fifty pounds to start with and fifty pounds when you empty your storage tank. Three different Portland firms are now at work on this kind of an outfit, which will be the power sprayer of the future.

Two-Year-Old Peach Orchard of Jas. H. Reid, Milwaukie, Oregon.
Cantaloupes growing between trees, August, 1908.

Apples. Trees should not be planted less than thirty-five feet apart, and forty would be better. I would not advise planting more than three varieties in an orchard. Yellow Newtown, Spitzenburgh, Jonathan, Rome Beauty, Grimes Golden, Northern Spy, Red Cheek Pippin and Ortley are all standard varieties. There have been large plantings in my district the past fall and winter.

Pears. Bartlett pears should be the principal pear planted, with a good cross fertilizer.

Prunes. When we get together and properly dry the fruit, and the packers do not try to inject too much water, prunes will come into their own.

Cherries.. Royal Ann, Lambert and Bing are the cherries to be planted in the order named, if you have cherry land. Not enough cherries are grown to supply the canneries, and if you have an old orchard that is not producing, if you will cut it back and turn hogs or sheep in, spray well, in a few years it can be made to produce profitable crops. Personally, I have tried hogs, and the results have been astonishing. Five years ago my orchard produced forty dollars' worth of cherries. Last year my crop sold for three hundred and fifty, and I will be much disappointed if it does not return five hundred this year. Ring your hogs well.

Small Fruits. Not enough small fruits are being planted to supply the demand for cannery purposes. More Cuthbert raspberries, Clark Seedling strawberries, Mammoth and Himalaya Giant blackberries should be planted, also the Kansas black-cap raspberry. Currants are also in good demand, but the best small fruit crop to grow, the easiest to care for and the best payer, is the gooseberry.

JAMES H. REID,
Commissioner First District.

Pear Orchard of W. K. Newell, Gaston, Oregon. April, 1908.

REPORTS OF CHARLES A. PARK,

Commissioner for Second District

APRIL MEETING, 1908

SALEM, OREGON, April 10, 1908.

To the Honorable State Board of Horticulture:

During the six months past there has been a very active interest shown in fruit growing in all of the counties of this district. There has been a campaign gradually developed against the old orchards which is proving quite successful.

Last January at Corvallis a convention was held which was attended by a large number of the county fruit inspectors of the state, together with most of the members of the State Board of Horticulture and certain members of the faculty of the Experiment Station. At this meeting Mr. M. O. Lownsdale presented a very feasible plan of inducing the owners of old apple orchards, which contain numerous varieties, to work over these old orchards into Newtown Pippins, for the reason that the number of small orchards in the Willamette Valley can thus be made to produce a uniform, well-known, staple variety and in such quantities that buyers will be attracted to this region to purchase the fruit.

In line with this work Mr. Lownsdale has very generously conducted numerous meetings in the nature of institutes, giving instructions in grafting, budding and packing of apples. These meetings have been held in all of the counties of the Second District except Lincoln County. This treatment of the old orchard will not only do away with the menace to the new orchards, but will turn the old orchards into sources of profit.

No one can work up any enthusiasm over an old, disease-infected, pest-ridden orchard of worthless apples.

Many new orchards are being set out in all of the Willamette Valley. Apples and cherries predominate. A large acreage of English walnuts has been planted, and on the whole there has not been as much activity in the line of horticulture since the first orchards were planted in the Willamette Valley.

The county fruit inspectors in each county in this district are enthusiastic, energetic men. They are carrying on their work as best they can considering the large amount they have to do. They have done more to stimulate interest in fruit culture than any other one thing. They have held numerous meetings of fruit growers in various parts of the respective counties. They have held

fruit fairs at the important points in their counties, and the promise is that they will see greater results this coming season than has ever before been manifested.

Salem has held two cherry fairs during the past two years. The manner of the display of the last cherry fair was far superior to the one held the year before, while we might say that the fruit in each was practically the same.

Linn County and Polk County have held apple fairs and Lincoln County showed enough interest to bring out a display of apples at the Albany fair.

These fairs are important measures in educating the fruit growers in regard to preparing their fruit for the commercial market.

The climatic conditions during the past winter and present spring have been very seasonable. While the winter has been mild, the spring has not opened up warm enough to advance the fruit beyond a safe limit. At the present day, after a week of warm, pleasant weather, the cherry trees are just opening into bloom, the pear trees have developed their buds into nearly the blooming point and the apples are following their nature by lagging on behind. There is very little danger of frost after this date and every prospect is good for an abundant crop of fruit in the Willamette Valley.

CHAS. A PARK,
Commissioner for Second District.

OCTOBER MEETING, 1908

To the Honorable State Board of Horticulture:

I herewith submit for the Second District the report for the year ending September 30, 1908. I am pleased to report the interest in horticulture in all of the six counties (Marion, Linn, Lane, Polk, Benton and Lincoln) has done a great deal in cleaning up the old orchards and in the planting of new ones with the determination of caring for them.

County horticultural societies have been organized in each of the counties, and each has held numerous meetings throughout the year. I might say in passing that more meetings of fruit growers have been held than of those engaged in all other branches of agriculture combined. The Lane County society has extended its work of co-operation to a greater extent than any of the other societies. During the past season it canned its own cherries and pears.

The apple growers of the Willamette Valley organized themselves under the name of the Willamette Valley Apple Growers' Association for the purpose of stimulating the growing of better fruit, and as conditions develop, to furnish a uniformly packed product for the market. As the morals of the community are on a higher plane

than that of the individual of that community, so is the box of apples packed under the supervision of the association better than the one packed by the individual grower. The Willamette Valley Apple Growers' Association is fortunate in having Mr. M. O. Lownsdale of Lafayette for its president, a man well qualified by intelligence and judgment to do a great work for the association.

Numerous fruit fairs have been held at different places in this district. Linn County concentrates its energies in making an exhibit of apples, and Marion County has been holding an annual cherry fair. On account of the most wonderful and beautiful exhibit of cherries displayed at the Salem cherry fair, Salem is called the "Cherry City of the World." We are glad to note that other sections of the State are following the example of Marion County.

Many inquiries have been received during the past year concerning this district as a fruit growing section. At this time it might be well to give some general facts concerning this district pertinent to fruit growing.

The counties of Marion, Linn, Polk, Benton and the greater part of Lane Counties may be taken as one section of the country in the Willamette Valley, and in fact includes all of the Willamette except the few counties lying north of this district, which embrace a continuation of the same beautiful and productive country. This section is bounded on the east by the Cascade Mountains and on the west by the Coast Range. The remainder of this district consists of Lincoln County and the western part of Lane County, and lies west of the Coast Range on the Pacific Ocean. It has the same general type in regard to climate, soil and products. I will speak of this section after presenting some facts concerning the Willamette Valley section in regard to its climate, soil and fruit products.

The climate of the Willamette Valley is temperate in all respects. The temperature does not go to extremes either in summer or winter. The proximity to the Pacific Ocean keeps the pendulum from swinging too far at either end of the arc. While the mercury may fall below zero once or twice during a winter, it seldom does. It is a rare occasion when the frosts prevent our roses in the open garden from blossoming until Thanksgiving and Christmas. We look upon freezing point as the low point on the thermometer as the people of the Eastern States look upon zero as the low point with them. It is not infrequent to have a winter pass without the mercury falling below 25 degrees above zero. The summer months are not hot. Ninety degrees above zero is seldom registered on the thermometer by our summer heat. The northwest trade winds bring us cool, refreshing breezes every afternoon during the summer, and hot nights are unknown. Our summers are dry, rain not interrupting the harvest of our products. Do we have rain during the winter months? Yes, a merciful Providence does bring to us on the mild southwest trade wind gentle showers, abundant and sufficient, to bless us—and we enjoy it.

Like all sections of the country, the Willamette Valley has some land not adapted to fruit culture, but there are thousands upon thousands of acres which are par excellent for fruit growing. We have the rich, river-bottom land; the bench of clay loam and the hills of clay soil, some of which are impregnated with oxide of iron. Anyone with judgment enough to raise fruit has judgment enough to select in this section the best of fruit-growing soil.

We now raise in a commercial way apples, pears, peaches, prunes, grapes, cherries, walnuts, filberts, almonds, all kinds of berries and small fruits.

The western part of Lane County and Lincoln County have some enthusiastic fruit growers who are getting fine results. Little has been done in a commercial way in this section, as all of the older apple orchards have so many varieties it is difficult to collect carload shipments of any one variety. However, the good-keeping quality of their apples and the total absence of worms creates a good demand for what apples they grow. Hundreds of acres of new orchards are being planted and old ones are better cared for. Land is cheap. It will pay anyone interested to investigate this section. The winters are mild and the summers are cool.

CHAS. A. PARK,
Commissioner for Second District.

A Willamette Valley Pear Orchard in Bloom. April, 1908.

FORBISS ORCHARD, DILLEY, OREGON.
Walnut tree in foreground, planted March, 1907; photographed September, 1908.

REPORTS OF A. H. CARSON,

Commissioner for Third District

APRIL MEETING, 1907

To the Honorable State Board of Horticulture:

In the year 1883-4 the Oregon and California Railway completed the building of its lines south of Roseberg through the Rogue River Valley south to Redding, California. This gave the Rogue River Valley railway facilities north to Portland, Oregon, and south to San Francisco. Prior to the completion of this railroad, now known as a part of the Southern Pacific, the horticultural development of the Rogue River Valley was of a primitive character. Apples, pears, grapes and other fruits were grown by the pioneer settlers only for home use. The only orchards of any size in the Rogue River Valley were the apple and pear orchards of E. K. Anderson of Talent, in Jackson County, of about ten acres, and the apple orchard of James Vanoy, four miles and a half west of Grants Pass, in Josephine County, containing about eight acres. There was no market for the apples and pears grown in these two orchards, and the surplus not required by the owners was freely given away to pioneer neighbors who were without fruit. When the railroad was completed, apple and pear buyers came into the Rogue River Valley from California and bought the surplus fruit from these two orchards, packing the apples and pears with their expert Chinese packers, and shipped the same south and east as California grown fruit. Oregon, or the Rogue River Valley, at that time received no credit for her apples or pears in the Eastern markets. Every box was shipped branded as California grown. It is a fact well known here that the Anderson and Vanoy orchards which were in their prime in 1883-4—the time of the building of the railroad—made both of these pioneers rich, as the demand created by transportation possibilities created high prices for the products of these two orchards.

It is correct to say that the Anderson and Vanoy orchards were the prime factors that started commercial apple and pear-growing in the Rogue River Valley, which at the present time has reached an acreage that E. K. Anderson and James Vanoy never dreamed of when they planted their orchards in the early pioneer days of the fifties.

In Jackson County there are now of young and old apple and pear orchards about 22,000 acres. The increased acreage the past winter has been greater than ever before. From reliable data I

Pear Orchard Near Ashland, Oregon.

have been able to gather I am conservative in saying that Jackson County the past winter has planted out 7,000 acres in new apple and pear orchards. As a basis for that data I can say that the Settlemeier Nursery Company has delivered the past winter 200,000 trees to Rogue River tree planters; the J. S. Barnett Nursery Company, of Central Point, has delivered 100,000 trees; two carloads came from Salt Lake nurseries—about 50,000 trees; approximately there have been delivered in the Rogue River Valley 50,000 trees from the Brownell Nursery Company, of Albany, and the R. H. Weber Nurseries, of The Dalles, Oregon, making a total of about 400,000 trees that were planted in the Rogue River Valley the past winter. Josephine County, in the Rogue River Valley, planted about 25,000 of these trees, and, allowing 25,000 trees for re-planting of orchards, would leave 350,000 trees that were planted to new orchards in Jackson County. Allowing 50 trees to the acre, this would add 7,000 acres of new orchards to Jackson's old acreage. I estimate that 65 per cent of Jackson County's new orchard acreage was planted in the vicinity of or adjacent to Medford. It will be but a few years until Medford will be the largest shipping point for apples and pears in the Pacific Northwest, if not on the Pacific Coast. Ashland is, and will no doubt be, the largest shipping point for peaches, as she already has a large acreage in peaches, and is steadily increasing that acreage yearly.

SPRAYING AND PRUNING.

Spraying and pruning the past winter has been done with more system and energy than any former year. Many old, worn-out, pest-infested, diseased orchards that could not be renovated, have been taken out.

Public sentiment, or perhaps I should say self-interest, with greater knowledge of how to fight pests, and make the orchard pay, together with the decision in the Sellwood case at Oregon City last November, has stimulated through active county fruit inspectors the negligent orchard owners to activity, with the result that spraying and pruning has been greater and more thorough than ever before.

A. H. CARSON,
Commissioner for Third District.

APRIL MEETING, 1908

To the Honorable State Board of Horticulture:

Present conditions of the fruit industry for the Third District are very favorable. The winter months past have been very favorable to all kinds of fruits. Twenty-six degrees was the lowest temperature had during the winter, with no excessive rains or floods to injure orchards on any kind of soil. March, being a cool month, has retarded blooming of all kinds of fruits, which makes it possible for us to escape late frosts should they occur. Apple, pear and peach trees will bloom very heavily, and, barring a late frost, the present prospects for a large crop of fruit is very promising. The only objection to such heavy bloom is if the grower neglects to properly thin his overloaded trees the grade of fruit will not be up to the standard that brings the grower the largest returns for his products.

With the heavy blooming promised now, the grower should be warned that his profits will be greatly augmented by careful thinning, and it is a detail he should not neglect. I will urge this subject, and request all county inspectors in my district to urge the growers to devote the labor necessary to assure the best, as only the best of all fruits can stand transportation charges to Eastern markets where all Oregon fruits are so much in demand.

COUNTY INSPECTORS.

During the past winter the inspectors of the Third District have been active and have accomplished much good. In Douglas County, Inspector Riddle has been on the road every fair day during the winter. He has caused many to spray that heretofore have been negligent. He has condemned many old, worthless orchards and caused them to be dug up and burned. Inspector Eisman of Josephine County has accomplished much commendable work, and all said of Inspector Riddle's work in Douglas County can be said of Inspector Eisman. In Jackson County Inspector Taylor has a large field to cover, with 25,000 acres of apples and pears to inspect, about 5,000 acres of peaches, besides imported tree inspection he has had to look after during the winter, has made him a busy man. It is believed that through Inspector Taylor's industry the pear blight that threatened Jackson County pear orchards is under full control. A tree-to-tree inspection by Mr. Taylor, and his teaching the growers how to identify hold-over pear blight has done much to lessen the possibilities of this disease working destruction to the pear orchards of Jackson County. The source of infection from pear blight comes from these hold-over cases, and where the hold-over blight is found and destroyed, this removes the source of next year's spread of the germs of this dreaded disease of the pear.

With increased acreage of orchards in Jackson County the ability of a single inspector to cover the ground will be a physical impossibility. In Coos County, Inspector M. G. Pohl has been active, and from reports I have had from that county he is accomplishing good work in the interest of Coos County horticultural development.

NEW ORCHARDS.

Inspector Taylor of Jackson County reports great activity in the planting of new orchards. Inspector Taylor reports that in February he had inspected 600,000 trees that were imported from out of the State to be planted in new orchards in Jackson County. To this number of trees must be added stock sold by local nurseries which will approximately aggregate near 900,000 trees that will be planted in new orchards in Jackson County this year. The greater part of this new planting will be of the apple and pear. Last year was the banner year of fruit-tree planting in Jackson County, but this year will make any former year look small in comparison.

GRAPE GROWING.

The adaptability of Josephine and Jackson Counties to the growth of commercial grapes has attracted attention, and now the foot-hill soils along the valleys are being improved and the grape is being planted on a large scale, the Flame Tokay being the favorite variety. In the vicinity of Grants Pass about 600 acres will be planted this spring. About 150 acres will be planted in the vicinity of Jacksonville, in Jackson County. Land is being cleared and preparations under way to plant two to three thousand acres to the grape in Josephine County next year. At present the grape crop promises to be good, and with a normal yield this year will stimulate this phase of horticulture to a wonderful degree.

Altogether the fruit industry is very promising indeed in the Third District. Douglas County is taking on new life in her great wealth of choice alluvial soils that are so well adapted to the growth of the apple and pear, and the planting of these two great staple fruits in that county will from now on be large.

The apple and pear crop of last season has been marketed with satisfactory results to the growers, and profits were such that the reason for such large planting of new orchards is accounted for.

A. H. CARSON,
Commissioner for Third District.

Yellow Newtown Apple Orchard Near Medford, Oregon.

OCTOBER MEETING, 1908

To the Honorable State Board of Horticulture:

I herewith respectfully submit my report as commissioner of the Third District for the biennial year ending September 30, 1908.

This district embraces the counties of Coos, Curry, Douglas, Josephine, Jackson, Klamath and Lake, all southern counties of the State of Oregon. Three of the southwest counties of the district —Coos, Curry and Douglas—are bounded on the west by the Pacific Ocean. A portion of Douglas County and all of Josephine and Jackson Counties lie between the Coast Range on the west and the Cascade Range on the east. Klamath and Lake Counties are east of the Cascade Range, bounded on the south by California and on the east by Harney County. The seven counties of the Third District aggregate an area of 26,000 square miles, equalling in area several of the states on the Atlantic Coast. This subdivision of the State, with the addition of Harney and Malheur Counties, is called Southern Oregon.

The topography of this subdivision of the state, with its mountains, foothills and valleys, is such that there are varied climatic conditions, as well as soils existing, and one section of Southern Oregon may be adapted to the growth and maturity of a variety of fruit that in some other section of the district would be a failure, and yet all parts of the section known as Southern Oregon are adapted, by reason of soil and prevailing climatic conditions, to some special commercial fruit growing.

These varied conditions of climatic and soil conditions of the Pacific Coast States are little understood by the average Eastern man who comes here to make a home. The Eastern man compares the annual rainfall of the Atlantic States with the annual rainfall of the Pacific States and finds the average nearly the same, forgetting that the annual rainfall of the East occurs in the spring and summer months, during the growth of crops, while on the Pacific Coast the annual rainfall occurs during our winter and early spring months, when our crops are being planted, and the Eastern man also assumes our annual rainfall is the same all over the State. The distribution of the annual rainfall in the seven counties of the Third District varies greatly during the year. The mountain ranges running north and south, the Coast and Cascade Ranges, are the physical factors in the annual distribution of the amount of precipitation each county of the district gets yearly. All moisture that is precipitated over the Pacific Coast States comes from the Pacific Ocean. A south or southwest wind drives the evaporation from the ocean over the land, and a continuation of a southwest wind for two or three days during the winter and spring months always brings rain. During the rainy period, the

greater precipitation always takes place west of the Coast Range, with a less precipitation between the Coast and Cascade Ranges. East of the Cascade Range the annual precipitation is small, in fact so small that all of that subdivision of the State east of the Cascades is called the arid section of the State.

To better comprehend the part these mountain ranges play in the annual distribution of moisture, I submit the following average annual precipitation at the United States Weather Bureau stations in the seven counties of the Third District, and the average precipitation for the months of June, July and August, to-wit:

WEST OF THE COAST RANGE.

	Inches.
Coos County, annual precipitation	72.32
Total for June, July and August	2.56
Douglas County, at Gardiner, annual precipitation	80.05
Total for June, July and August	4.05

EAST OF THE COAST RANGE.

Douglas County, at Roseburg, annual precipitation	35.16
Total for June, July and August	1.98
Josephine County, at Grants Pass, annual precipitation	33.86
Total for June, July and August	1.34
Jackson County, at Jacksonville, annual precipitation	27.03
Total for June, July and August	1.65

EAST OF THE CASCADE RANGE.

Klamath County, at Klamath Falls, annual precipitation	14.35
Total for June, July and August	1.54
Lake County, at Lakeview, annual precipitation	16.73
Total for June, July and August	1.69
Lake County, at Silver Lake, annual precipitation	10.06

It will be noted that at Gardiner, in Douglas County, the annual precipitation is 80.05 inches, and the average for June, July and August, 4.05. At Roseburg, in the same county, the annual precipitation is only 35.16 inches, while the average for June, July and August is 1.98 inches. Gardiner is but a few miles from the ocean, on Winchester Bay. The Coast Range at Gardiner closes in, high and abrupt, and these high mountains rapidly condense the moisture from the clouds. Roseburg, being east of the Coast Range, only gets the moisture that failed to condense on the west side of the range during the rain storms of a season.

As the moisture-laden atmosphere blows in from the ocean, the Coast Range condenses much of it; that which escapes condensation passes over the Coast Range and precipitates between the Coast and Cascade Ranges. By the time the moisture-laden air passes over the Cascade Range its moisture has lessened, hence the light annual precipitation in Klamath and Lake Counties.

When the annual precipitation is normal, crops of all kinds mature on any of the deep soils between the Coast and Cascade

Ranges with good cultivation. The ability of the fruit grower on this coast to conserve moisture by intelligent cultivation during the dry period of the year would be a revelation to an Eastern farmer. On deep hill soils I have seen corn that produced thirty-five bushels to the acre, without a drop of rain from planting to gathering. Without cultivation the corn would have perished for the want of moisture. Deep, alluvial, sandy-loam soils along the rivers and creeks never fail to yield, although the cultivation may be poor, as these soils are always sub-irrigated.

Many Eastern men who come here desire to engage in apple or pear growing. Not being judges of our coast soils, they purchase land from surface indications, and in time find they have made a mistake. To succeed here in fruit growing, the grower must plant the variety of fruit his soil and location is adapted to. Soil and location that the peach and grape would succeed on with reasonable attention to detail, might be of such a character and depth that the apple and pear planted on the same would be a failure.

It is my purpose in this report to call the attention of the prospective purchaser to the various soils as they exist in this district, with their character and adaptability to fruits they will grow with success.

THE APPLE AND PEAR.

The apple and pear, to be a source of profit here, should be planted on the best alluvial soils along the streams, or if the hill lands are chosen, they must be deep, not less than five to six feet in depth, and a greater depth would be better. There are no soils too good and rich to grow the best apples or pears. The success and profits of the Rogue River Valley apple and pear grower are in proportion to the good quality of the soil his orchards are planted on and the attention he gives to details in its management. A shallow soil will spell failure if planted to the apple and pear, unless water is available for irrigation during the months of August and September. However, it must be remembered that not all shallow soils are adapted to irrigation. To irrigate with profit, the subsoil must be right. If the subsoil is wrong, irrigation would be detrimental. A shallow loam soil two and one-half feet deep, resting on decomposed bedrock or broken bedrock or loose gravel would be all right for irrigation. Irrigation, if intelligently done, would be a great benefit to an apple or pear orchard on such land, for the reason that the surplus water in irrigating would readily drain off through the gravel and bedrock without injury to the growing tree, on the other hand, should a shallow soil rest on a clay subsoil or a cement hardpan, irrigation would be detrimental to the growing of apple and pear trees. To successfully irrigate fruit trees on any of our soils here underdrainage must be had to carry off the surplus water during the irrigation period. These shallow soils with a clay subsoil or cement hardpan can be made available

A Model Bartlett Pear Tree, Hoover Orchard, Medford, Oregon.

for apple and pear growing by tiling to a depth of not less than five feet.

Where irrigation is resorted to the conditions of the subsoil in relation to the growth of the tree must be intelligently understood. The mechanical effect on shallow soils by underdrainage with tile is to deepen the soil to the depth the tile is laid. During winter rains the surplus water where land is tiled is drained through the soil and passes off through the tile, preventing the fruit tree from injury from excessive moisture during protracted rain storms of winter, keeping it healthy and vigorous during the dormant period, so that when it quickens into growth in the spring it is in the best possible condition to grow and responds to the skill and cultivation of its owner. Again, while the mechanical effect of undertrainage is to deepen the soil and carry off the surplus moisture, paradoxical as it may appear, underdrainage makes these shallow soils moist during the growing period. During the growing period the moisture-laden air passes through the tile and its moisture is condensed and left in the soil for the growing tree. In fact, with thorough, intelligent cultivation where these shallow soils are properly underdrained, but little water is necessary for irrigation during the dryest season.

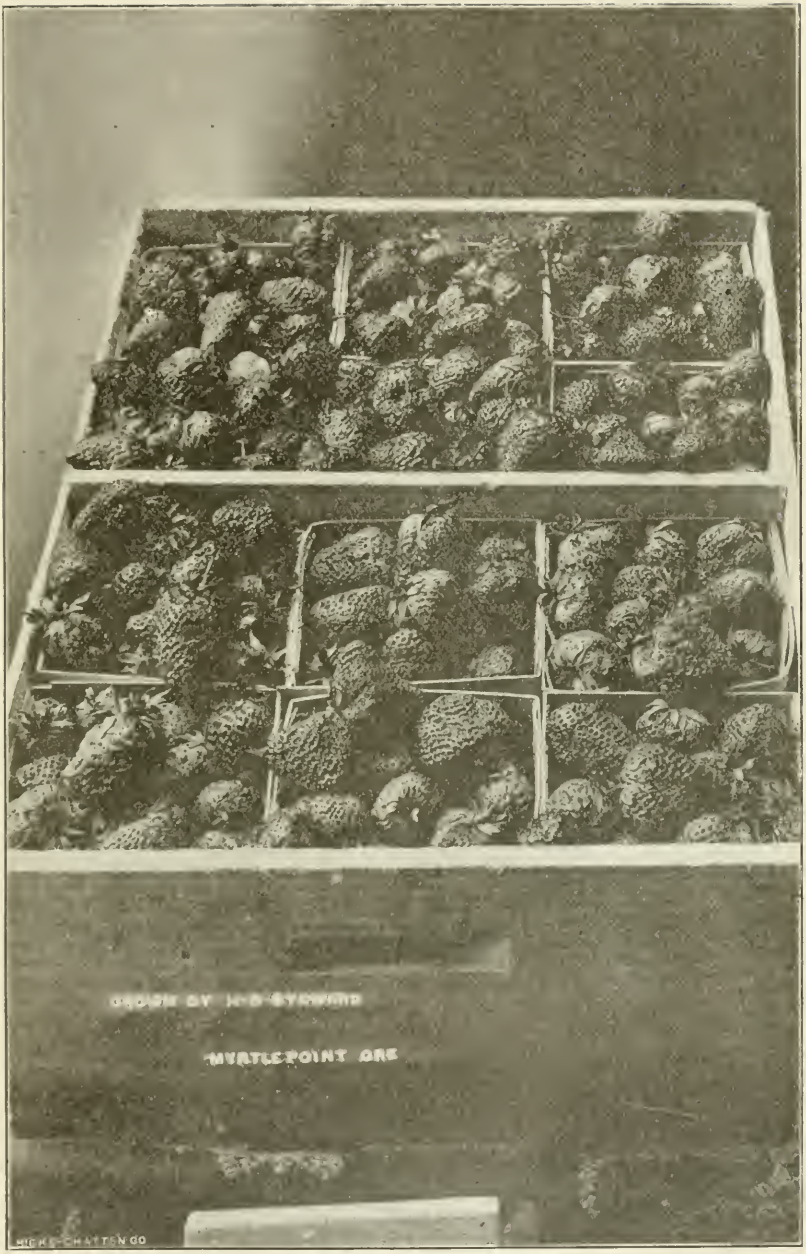
On any of these shallow soils, where the exposure is right, grapes can be profitably grown without underdrainage, and, with a depth of three or more feet, the peach can be grown with good cultivation.

There are many acres of deep, rolling lands, such as second bench, red loam, on which in normal years, under good cultivation, the apple and pear can be grown at a profit, and with water for irrigation during the dry seasons these deep bench lands can be made very valuable. In past years I have noted many acres of these shallow, dry soils being planted to the apple and pear, without any consideration of the character of the subsoil or what the effects of underdrainage would be were it tiled. I know in all reason that the results and profits in planting such soils will be a disappointment to the grower; hence I call the attention of the growers to this subject of soils adapted to growing various varieties of fruits.

As to the variety of climate and soils in the various counties in the Third District and annual precipitation had in each county, I hope by a detailed description of each county to give the prospective settler some data that will enable him to intelligently judge soil conditions that will be congenial to the fruit he may desire to grow.

COOS COUNTY.

Coos County is a coast county. To an extent this rich county is isolated from the balance of the State for the want of railroad communication with the interior. Coos County's only means at present to reach markets for her lumber, coal, dairy and fruit



21-Pound Crate of Coos County Strawberries.
Grown by H. B. Steward, Myrtle Point, Oregon.

products is by steamer from Coos Bay. Twice a week steamers arrive and depart for Portland, carrying freight and passengers to and from Marshfield and North Bend, vigorous, up-to-date cities on the bay. To get into Coos County by land, one has to go by private conveyance or by stage from Roseburg or Drain, both stations on the Southern Pacific in Douglas County.

At present the leading industries in Coos County are lumbering, coal mining, dairying and, to a small extent, fruit growing. In value, Coos County dairy products are the second in the State.

The past year the people of Coos have awakened to her great horticultural possibilities, and from now on her horticultural development will be rapid. Last year, 1907, Coos shipped to California markets 35,000 boxes of apples, the greater number of boxes being the Gravenstein. The soil and climatic conditions are ideal for the growth of the Gravenstein apple. If Coos County apple growers make a specialty of this superb fall apple and grow it on commercial lines, with railroad facilities to interior markets, she can work up a demand for this apple that will tax her energy to supply. Any fruit district that can grow a commercial fruit of any type better than other districts should make that particular specialty their leading crop.

The alluvial, sandy-loam soils along the Coos and Coquille Rivers are deep and very productive. Potatoes on these bottom soils yield as high as 500 bushels to the acre. Oats often turn out as high as 125 bushels to the acre, and barley 145 bushels.

The foothill soils of Coos, unlike the same soils in the interior of the State, are sedimentary in character, deep and very rich in plant food. These foothill lands will grow the apple and pear, and are especially adapted to their growth. The acreage of these hill lands in Coos is large, with a very small per cent used for cultivated crops. As the timber is removed from these hill lands and the underbrush burned, sow to timothy, or any of the tame grasses, and without harrowing the seed germinates, and, owing to the moisture that drifts in from fogs from the Pacific, perpetual pasture is had, as at no part of the winter season does frost occur, for the warm Japan current flowing up the coast from the tropics gives off heat to prevent it.

Berries of all kinds thrive and bear large crops on any of the soils in the county. Cultivated blackberries, raspberries, loganberries and strawberries bear heavier crops than in any other section I have ever seen. While in the county last June I found the wild strawberry growing everywhere through the hills. I found but few cultivated strawberries in the county, excepting at Myrtle Point, at the head of tidewater on the Coquille River. At this point I found Mr. H. B. Steward, postmaster, cultivating three and one-half acres in strawberries. Mr. Steward is an expert strawberry grower. His strawberry acreage is located on a high hill, with red loam soil,

Coos County Strawberries,
Pound box grown by H. B. Steward, Myrtle Point, Oregon.

overlooking Myrtle Point and the Coquille River Valley. Mr. Steward's success with the strawberry at this point has been great, and the profits he has been able to realize from an acre make an object lesson for Coos County that will be a source of great wealth to the people of that locality if they take advantage of the lesson he has taught them. When railroad connections are had with interior markets, the demand for such fine strawberries as are grown by Mr. Steward will be for many years greater than they can supply. Mr. Steward assures me that off of his three and one-half acres of the Magoon, Glen Mary and August Luther varieties he has been able to realize, net, $1,600 per acre. To many strawberry growers in less favored sections than Coos County I know $1,600 profit per acre will be taken as a real estate story, told for booming purposes, but it should be known that Mr. Steward's strawberries begin ripening May 15 and continue to bloom and mature their fruit to October 15, enabling the grower to gather ripe berries every day between the dates mentioned, getting as much as four crops, as compared with less favored sections during the year, and the profits he assures me he gets are, I know, facts. Mr. Steward's soil being very rich and congenial to the growth of the strawberry, and the moisture-laden air, drifting over the land daily and condensing at night in heavy dew, keeps the vines strong and vigorous during the bearing season, which with his skill as a grower, are the secrets of his profits and success. Last year Mr. Steward won the prize offered by the Strawberry King of the United States, Mr. R. M. Kellogg of Three Rivers, Michigan. The prize was for the best crate of strawberries grown in the United States. Mr. Steward's prize-winning crate contained twenty-four quart cups and averaged thirteen strawberries to the cup, uniform in size and perfect in color.

CRANBERRIES.

Adjoining Coos Bay there are several thousand acres of marsh lands that are adapted to cranberry growing. Mr. C. D. McFarlin of North Bend has five and one-half acres in cranberries on North Slough Marsh. The results of his patient toil prove the adaptability of the marsh lands of Coos County for cranberry growing. Let him tell it, as he told it to me in his letter of June 14, 1908: "I began cranberry growing twenty years ago on North Slough, in Coos County. At the beginning I was comparatively a novice, and I made many costly mistakes. * * * I began without any capital. For the last sixteen years my five and a half acres have paid me $1,000, net, annually. Last year I sold from my marsh $2,970 worth of cranberries, leaving me, net, $1,800 profit.

"My experience proves to me that with our climate and soil and other conditions of this section, Coos County cannot be surpassed for cranberry culture in any part of the United States.

"In regard to insect pests that threaten cranberry culture in Wisconsin, New Jersey and Cape Cod, I feel sure we are free from that danger. In importing vines from Cape Cod I also imported the larvae of the vine worm and the fruit worm. They hatched and were in evidence the first year and then disappeared. I am convinced these pests cannot live and multiply in this climate. * * *

"The first cost of marsh land is from $50 to $150 per acre. * * * To prepare, plant and bring vines to bearing age will cost $500 per acre. The third year the vines will produce two-thirds of a crop and a full crop the fourth year. Cranberry culture will pay, on an established marsh, 10 per cent on a valuation of $2,000 per acre. This has been the profits I have had for the past sixteen years. * * *"

The foregoing experience of Mr. McFarlin in cranberry culture in Coos County should not be overlooked by men of capital, as this particular field for investment should appeal to them.

CURRY COUNTY.

Curry is a coast county, mountainous, with many small valleys that are rich in good soils. To the extent of her available soils, what has been said of Coos County would apply to Curry.

DOUGLAS COUNTY.

Comparatively speaking, this county embraces an empire. Beginning at the top of the Cascade Range, thence running west through the Coast Range to the Pacific; beginning on the south at the northern boundary of Jackson and Josephine Counties, it runs north to Lane County. Its greatest width north and south is about eighty miles. This large county is known as the Umpqua Valley, and is drained by the North and South Umpqua Rivers and their many smaller streams. The Southern Pacific Railroad runs north through the county for near one hundred miles, with stations at Glendale, North Fork, Riddle, Myrtle Creek, Ruekels, Roseburg, Wilbur, Oakland, Yoncalla and Drain. Roseburg is the county seat, with a population of 3,500.

Along the railroad there are many thousands of acres adapted to the growth of the Yellow Newtown, Spitzenburgh and Jonathan apples that commercially have made the Northwest Pacific famous as an apple-growing district.

The best soils for apple and pear growing in this section are the alluvial deposits along the streams, although many of the deep foothill soils of the county mature the apple and pear and are profitable to plant in commercial orchards.

Douglas has a large and profitable acreage in prunes, as well as peaches. There is a larger available acreage adapted to apple and pear growing, with transportation facilities, at present, in Douglas County, than in any other county of the Third District. Not over

20 per cent of her available apple and pear lands are yet planted to orchards.

In portions of Douglas County there are more or less adobe lands, locally called "black mud soils." These adobe soils are strong, rich in plant food, and if underdrained by tiling would be equally as good for apple and pear growing as the sandy loams along the rivers and creeks.

There are many small valleys that drain into the Umpqua River which contain thousands of acres that are available for commercial apple, pear, peach and prune growing.

At present the opportunity in Douglas County for the small fruit grower or one who desires to plant on a commercial scale, are the best, as climatic conditions are congenial to the very best apples, pears, peaches, prunes and all of the berry fruits, with good transportation facilities to reach local as well as Eastern markets.

JOSEPHINE COUNTY.

Josephine County is a southern county, next to California. Its topography embraces mountains, foothills and many small valleys running in all directions through the county. The county is drained by the Rogue, Applegate and Illinois Rivers, with many smaller creeks that are tributary to the larger rivers. The best alluvial soils are along the streams, which are devoted to the apple, pear and peach. These fruits mature to perfection.

Potatoes and all kinds of garden truck are raised and find a ready market among the miners in the mountains and the towns of the county. Corn, clover, timothy and alfalfa grow luxuriantly along the streams, without irrigation, and alfalfa yields three crops during the year. On the foothill soils alfalfa yields three crops in the year where water is available for irrigation. On deep hill lands alfalfa matures one good cutting, and, if the season is favorable, two cuttings without irrigation. The demand for hay in the local market is always greater than production, owing to the large lumber and mining industries of the county. Alfalfa in this county is a great source of profit, paying as high as $40, net, per acre.

There are many acres of foothill lands in this county that years ago were regarded by the pioneer as only fit for grazing. Experience has taught later generations that these red foothill lands grow the best of table grapes. Such superb European varieties as the Flame Tokay, Malaga, Muscat, Black Cornichon, together with all the American types of grapes, grow and mature to perfection. Now many acres of these red foothill lands are being cleared and planted to commercial vineyards. The value of these red hills are advancing rapidly. A well-kept vineyard of Flame Tokays on these red hills is an annual source of profit to its owner. Spring or fall frosts rarely injure a vineyard on the slopes of the foothills. In fact, the writer had a commercial vineyard on the foothills of Josephine

HILL ORCHARD, BARTLETT PEARS, MEDFORD, OREGON.

County for twenty-eight years and never suffered an injury from spring or fall frosts during that period until this "freak" year, 1908, when a frost occurred that killed the foliage on the vines on September 25, with the result that many late varieties that had not ripened were a loss. The earliest fall frost that ever before occurred during the twenty-eight years was on October 25, 1905. All varieties being then ripe, no loss was sustained.

JACKSON COUNTY.

Jackson County is the largest county in the Rogue River Valley. The Rogue River Valley in this county has a width of about sixteen miles, and is twenty to twenty-five miles long. The lands in this expanse of valley are a rich alluvial deposit that in early days was devoted to farm products. Wheat, when the soil was new, yielded from forty to fifty bushels to the acre; corn, forty to sixty bushels.

The adaptability of this rich valley to the growth of all kinds of horticultural products has made the land of this valley too valuable for growing farm products, hence at present but little farming is done. Year by year the planting of orchards is increasing, and a few years more will see this valley a vast orchard of apples, pears and peaches. Today there are about twenty-five thousand acres planted in apples, twelve thousand acres in pears, and six thousand acres in peaches in Jackson County. Medford, a thriving city of 4,000 population, is the center of the apple and pear industry, on the main line of the Southern Pacific Railroad for shipping facilities. In all directions from Medford are apple and pear orchards, varying in size from ten to four hundred acres.

Ashland, twelve miles southeast of Medford, on the Southern Pacific, with a population of 5,000, is located on the edge of the valley at the beginning of the Siskiyou Range, on Ashland Creek. While many apple and pear orchards are in the vicinity of the city, as a peach-growing section it is the largest in the district. The foothills around Ashland are all in peach orchards and the annual shipments of peaches from this city run into the thousands.

Jacksonville, the county seat of Jackson County, is four miles west of Medford at the beginning of the foothills. Fine apple, pear and peach lands adjoin the town, and the foothills are the very best for growing all kinds of European grapes.

Whatever may have been said of Josephine County as a grape-growing district can in truth be said of Jackson County. Jackson and Josephine Counties are both in the Rogue River Valley; climate and soil conditions are identical. The winters are mild; snow rarely falls in the valley. It is an "unusual winter" that the thermometer goes as low as 18 degrees above zero. The orchardist and the farmer does his plowing, planting and seeding in the Rogue River Valley during the winter months; rarely does freezing weather occur. The Rogue River Valley is rightly called the "Italy of America."

KLAMATH AND LAKE COUNTIES.

These two counties are east of the Cascade Range, on a high plateau, varying in altitude from 2,500 to 3,500 feet. The Klamath River has its source in Klamath County and drains the basin.

The first settlers of Klamath and Lake followed stock raising. Thousands of horses, cattle and sheep were raised and grew fat on the nutritious bunch grass that grew on the hills. At the beginning what little land was farmed to supply the necessities of the stock raiser was found very productive. With increased population, the waters of the streams were conducted by ditches to the sage brush lands and alfalfa grown, yielding three and four crops in a season. A few "home orchards" were planted, which in time bore the finest of apples and pears, and with age produced the finest of fruit in quality, size and color.

The building of the railroad from Laird, on the Southern Pacific, to Klamath Falls, the county seat of Klamath County, is stimulating the people of that county to plant commercial apple orchards. This year there will be many acres planted, so I am assured by Mr. O. A. Stearns, county fruit inspector of Klamath County. With water available for irrigation, berries of all kinds yield large crops. Owing to the light annual precipitation in Klamath and Lake, water is a necessity for irrigation to get the best results on much of their lands. The government is now completing, under the Reclamation Act, a system of irrigation that will irrigate 180,000 acres in this county. With this system completed and railroad connections to Klamath Falls, Klamath County will, in a few years, become one of the richest counties in the State in horticultural and farm products.

Lake County is east of Klamath. Lakeview is the county seat, with a population of 2,500. It is a typical Western stock-raising town, located at the northern end of Goose Lake. With rail connections Lake County has every advantage possessed by Klamath County. Lake County is well watered, having a great number of lakes within its borders. Silver, Summer, Albert, Warner, Guano and the northern half of Goose Lake, with many small streams flowing into the lakes is the source of water supply of Lake County.

RECREATION.

To the fruit grower, in connection with his work in the orchard, when work becomes irksome and recreation is needed, the Third District, with its mountains and streams, offers every opportunity. The mountains and foothills contain an abundance of deer, bear and other large game. Quail are very plentiful in the valleys. During the winter months water fowl are plentiful about the lakes and streams. All streams are stocked with plenty of fish. The mountain trout, steelheads, salmon trout and salmon are very plentiful in the Umpqua and Rogue Rivers and their tributaries, and large numbers are caught in season with hook and line.

NEW ORCHARDS.

Each year the planting out of new orchards is done. Last winter and spring Jackson County planted about 8,000 acres to new orchards. Douglas County will plant a large acreage the coming winter to apples and pears. Large tracts of fine apple land have been purchased by commercial apple growers. Coos, Josephine, Klamath and Lake are preparing for activity the coming winter and spring, planting new orchards.

MARKETS.

The old question, "over-production," is always coming up. "Where can you market all this fruit when in bearing?" To those who have not studied transportation facilities and market demands of the masses for good fruit, the question of over-production is pertinent. From a hygienic point of view, the people are learning it is cheaper to daily eat fruit and have health than gorge on meats and have to pay the doctor. The demand for fruit is constantly on the increase as the masses become educated on lines of health. The increase of population is always increasing the demand for the best. The fruit zones throughout the United States, for certain types of apples, such as the Newtown and Spitzenburgh, is very limited. These two varieties are the commercial apples of the Northwest Pacific States. There is no other fruit zone that can grow a Newtown or Spitzenburgh with success on commercial lines. These superb apples do not compete with Eastern-grown apples. If there was competition, why do our Eastern apple growers sell a barrel of their best apples, containing two and a half bushels, in Eastern markets for less than the grower gets for a box of our apples of one bushel? Many thousands of boxes of Newtowns are exported to Europe, and as the keeping and shipping qualities of these apples are better known, this demand will increase yearly. The Orient is beginning to import apples from the Northwest Pacific, and that demand from now on will increase faster than our ability to produce. The Northwest Pacific has the world for such apples as her climate and soil can grow. The secret of her ability to supply and hold the market is to grow only the best, packing it the best. Where soil conditions are right here, and a failure occurs in apple and pear growing, the cause will always be found in the neglect of the man; his neglect of details, as spraying at the proper time, lack of intelligent cultivation, and thinning the fruit and careless packing.

Success in fruit growing, as in any line of business, is had only where the grower is willing to pay the price: intelligent, hard WORK.

"Next-year men," *i. e.*, men who are always going to do a thing next year, should never go into fruit growing. They will fail.

The man who makes a success is the man who does in his orchard the things that need to be done as they come up, *now*.

Two-Year-Old (from planting) Cherry Trees on Five-Acre Orchard Home of A. Johnson, Ashland, Oregon.

There is no line of general farming that will pay the per cent acre per acre that can be obtained on suitable land by the skilled fruit grower in apples, pears, peaches or grapes.

DISEASES AND PESTS.

The question of fungous diseases and insect pests in fruit growing no longer deters the intelligent grower. Fungous diseases readily yield to and are controlled by Bordeaux. All leaf-cutting and fruit-eating insects are controlled and injury reduced to a small per cent by spraying with arsenate of lead. For insects that suck the juices or sap, such as San Jose scale, aphis, etc., the lime-sulphur spray is effective. In Spray Bulletin No. 4, issued by this Board, the lime-sulphur spray is recommended for preventing apple anthracnose and peach leaf curl. I have found so many failures to control these fungous diseases with the lime-sulphur spray, that I suggest the next bulletin issued by the Board omit this recommendation and substitute the Bordeaux mixture as the remedy for these fungous diseases. Under my observation the past year, where Bordeaux was used these diseases did not appear. On the other hand, where the lime-sulphur spray was used to prevent anthracnose and peach leaf curl, the diseases appeared.

PEAR BLIGHT.

This disease alarmed the pear growers of the Rogue River Valley the past year. California pear growers suffered so badly three years ago from this disease, when it appeared, it brought the pear growers about Medford together to wage united effort to control it. Professors M. B. Waite and P. J. O'Gara of the Department of Agriculture, Washington, D. C., were sent to teach us how to fight the disease. Through their instructions George W. Taylor, county fruit inspector, is meeting with success in controlling the disease. The only known remedy for pear blight is to cut out all diseased parts of the tree and burn the same. The germs of this disease multiply rapidly, and were it not for the fact that so many of them perish during the season of infection, it would be difficult to cope with and successfully control the disease.

The tree is immune to infection excepting through the blossoms and abrasions on the tree. The source of annual infection comes from hold-over germs that are kept alive during the winter in the larger limbs and trunk of the tree that have been infected by reason of abrasions. Moisture is necessary to the life of the germ, and in the smaller twigs, for the want of moisture, most of these germs die. In the larger limbs the moisture keeps the germs alive. With the warm days of spring these germ-affected large limbs exude sap that the bees and insects feed upon; the germ is thus carried by the bees to the pear blossoms and the germs multiply rapidly and

kill the twigs. In August I found pear blight in two pear orchards in Douglas County. In a number of orchards I visited in this county the two were the only ones where I found the disease. I taught the owners how to identify the disease, and the remedy, and they at once began active work to control it.

In cutting out limbs infected with pear blight, it is necessary to cut well below the part that shows infection, and in all cases, after cutting off a limb, the knife should be sterilized to kill any germs that might adhere to it, as cutting into healthy wood would cause infection. Professor O'Gara, an expert on pear blight, says: "You cannot prick the point of a needle into germ-infested pear blight and then prick the same into healthy wood without inoculating it with the germs."

FIELD WORK.

The past two years I have visited the greater part of the district and attended many fruit growers' meetings. I have found the growers in most cases active and modern in their methods of care of their orchards. In Jackson County the Rogue River Horticultural Society is an active organization. Nearly every fruit grower in Jackson County is a member of this society and shows interest in all monthly meetings held by the society by always being present.

Douglas County's society is equally as active as is Jackson's.

During the two years I have received a great many letters from Eastern people asking for specific information on every phase of fruit growing in this district. I always answer these letters cheerfully. A great many letters come to me from the growers in the district. All are answered.

I have delivered in the district all the biennial reports of this Board for 1907 that I was allotted, but had many applications for them that could not be supplied. The State should furnish this Board with not less than 10,000 copies of the biennial reports, so that each fruit grower of the State could have a copy.

INSPECTION WORK.

The county fruit inspectors in my district have been active and have covered much of their respective counties. In Jackson County Inspector Taylor has been active in teaching the fruit growers how to treat the pear blight, and the sentiment he has worked up among them in regard to the danger that this disease, if not controlled by cutting out, will in a short time destroy their orchards, has in a great measure abated the disease. In Douglas County, Inspector Riddle has done much good work for that county. He has caused many orchards to be sprayed for San Jose scale that were never sprayed before, and in a great many cases where old orchards would not pay to spray he has caused them to be cut down and burned.

Inspectors Eisman of Josephine, Stearns of Klamath, and Smith of Lake Counties, have done much good work toward cleaning the orchards of their respective counties and enforcing the horticultural laws.

With increased acreage planted in the larger counties of the Third District, one inspector to police each county will be a physical impossibility, and some provision in the law should be made so additional inspectors could be appointed, on petition of the fruit growers.

Public sentiment is the prime factor in the enforcement of all our horticultural laws. The majority of our fruit growers are in accord with the strict enforcement of the laws, but the thoughtless and negligent will not bestow the necessary labor to destroy insect pests and fungous diseases unless someone with authority of law compels them to.

CODLING MOTH.

The results had the past two years in spraying with arsenate of lead for the apple worm in my district have been very satisfactory to all apple growers. In many apple orchards, where the spraying was done carefully, the loss from wormy apples was less than 2 per cent.

CROP ESTIMATES.

Owing to unfavorable conditions in 1908, the fruit output for the two years of 1907 and 1908 does not show the increase either in quantity or total which would have been made under normal conditions. The spring of 1908 was cold and backward and unfavorable to the distribution of pollen and many trees which bloomed heavily did not set fruit. The light precipitation of last winter was followed by a drought during the spring and summer unequalled in the record of "the oldest settler." As a result of these untoward conditions the fruit crop this year has been very short.

PRODUCTION AND VALUE—1907 AND 1908.

The amounts of the commercial crops of the different fruits by counties for the Third District for the years 1907 and 1908 have been as follows:

DOUGLAS COUNTY.

	1907.	1908.
Apples, boxes	40,000	20,000
Pears, boxes	10,000	6,000
Peaches, boxes	75,000	50,000
Prunes, cured, pounds	5,000,000	4,000,000
Peaches, dried, pounds	15,000	10,000
Strawberries, 24-box crates	15,000	10,000
Blackberries, crates	8,000	6,000

JOSEPHINE COUNTY.

	1907.	1908.
Apples, boxes	20,000	10,000
Pears, boxes	2,500	1,500
Peaches, boxes	30,000	35,000
Strawberries, 15-box crates	4,000	3,000
Blackberries, crates	2,000	1,500
Grapes, crates	6,000	4,000

JACKSON COUNTY.

	1907.	1908.
Apples, boxes	250,000	150,000
Pears, boxes	120,000	75,000
Peaches, boxes	115,000	75,000
Prunes, cured, pounds	100,000	75,000
Strawberries, 15-box crates	50,000	30,000
Peaches, dried, pounds	10,000	5,000
Blackberries, crates	20,000	15,000
Grapes, crates	1,500	1,000

COOS COUNTY.

	1907.	1908.
Apples, boxes	35,000	30,000
Strawberries, 24-box crates	3,600	4,000
Cranberries, bushels	600	650

A. H. CARSON,
Commissioner for Third District.

REPORTS OF R. H. WEBER,

Commissioner for Fourth District

APRIL MEETING, 1907

To the Honorable State Board of Horticulture:

The Fourth Horticultural District has to record the most prosperous season during the year 1906 that it has ever experienced. Crops were good and prices prevailing were high on all kinds of horticultural products. This condition has brought in its wake the greatest activity ever known in horticultural circles. Plantings of trees this spring surpass all previous records, and thousands of acres will be added to the already large acreage of orchards in the Fourth District.

Wasco County, of course, furnishes most of the ground for these increased plantings, which consist of apples, cherries, peaches, pears, apricots, almonds, plums, prunes and grapes. Hood River, as usual, takes the lead in expansion and will plant at least 100,000 trees, most of which are apples of the leading commercial sorts, consisting of Newtown, Spitzenburgh, Arkansas Black, Winesap, Ortley and several other varieties of less prominence. It is noticeable that Newtowns are gaining in favor to an appreciable extent, and Arkansas Blacks are in a measure taking the place so conspicuously occupied by the Spitzenburgs. Color, keeping and shipping qualities are responsible for this change. Mosier is planting its usual quota of apples, cherries and peaches, while The Dalles, at last waking up to its wonderful possibilities, is trying to vie with itself in an effort to outdo any of its former efforts. Fully 25,000 cherries, 15,000 peaches, 5,000 apricots, with numerous trees of other kinds, will add to its rapidly increasing orchard acreage.

Favorable weather of the past winter and early spring promise abundant yield for the coming season, and point to another prosperous year for the fruit grower of Oregon.

R. H. WEBER,
Commissioner for Fourth District.

APRIL MEETING, 1908

To the Honorable State Board of Horticulture:

Development in fruit growing in the Fourth Horticultural District, comprising Wasco, Sherman, Gilliam, Morrow, Wheeler and Crook Counties, is more extensive than in any previous year. Truly marvelous is the increase in orchard acreage, with Wasco County

Apple-Packing House of A. I. Mason, Hood River, Oregon.

far in the lead. In place of scattering orchards of a few acres each, as was the case not long ago, the eye is greeted now with large tracts set solidly to trees of high-class, commercial varieties. Men who but a few years ago were fearful of over-production have now become enthusiasts in the business, and with their optimism inspire the tardy ones and are foremost in their efforts to make Oregon the greatest fruit-producing State in the Union, a position to which she is naturally entitled. The recent financial flurry has apparently failed to affect the fruit-growing interests, and instead of retarding has added new stimulus to the industry. The year 1907 will go down in the annals of history as a banner year for the fruit grower. High prices prevailed, which, coupled with a very heavy crop, brought much prosperity to the horticulturists of the State. Orchard pests, which up to a few years ago were the dread of the fruit grower, have lost much of terror and can readily be kept in check by the application of remedies recommended by the Board and which are printed in their semi-annual reports, as well as in the spray bulletins issued by that body, which can be secured from any member of the Board upon application. With careful spraying, thorough cultivation and honest packing for a motto, fruit growing in Oregon is an assured success.

With strict adherence to the above motto the next few years will bring still greater prosperity and show more rapid development in fruit growing than it has in the past. Climatic and soil conditions are ours, and it is left for man to do the rest to make of Oregon the fruit granary of the world.

R. H. WEBER,
Commissioner for Fourth District.

OCTOBER MEETING, 1908

To the Honorable State Board of Horticulture:

Crop conditions in the Fourth Horticultural District for the year 1908 make a most favorable showing, as shown by the following figures:

HOOD RIVER.

Apples, boxes	300,000
Pears, boxes	5,000
Cherries, boxes	5,000
Prunes, boxes	3,000
Strawberries, boxes	70,000
Raspberries, boxes	500
Blackberries, boxes	2,000

MOSIER.

Apples, boxes	23,000
Pears, boxes	700
Prunes, boxes	14,000
Peach plums, boxes	4,000
Cherries, boxes	7,500
Peaches, boxes	1,400
Apricots, boxes	200
Strawberries, boxes	1,200

THE DALLES.

Apples, boxes	20,000
Pears, boxes	35,000
Prunes, boxes	95,000
Plums, boxes	12,000
Peaches, boxes	120,000
Apricots, boxes	8,000
Strawberries, boxes	5,000
Raspberries, boxes	600
Blackberries, boxes	1,200
Cherries, tons	300
Grapes, tons	200

With the young orchards now set out in bearing, in about five years the output of this district should be reach $10,000,000.

Very respectfully submitted, R. H. WEBER,

Commissioner for Fourth District.

REPORTS OF JUDD GEER,

Commissioner for Fifth District

APRIL METEING, 1907

To the Honorable State Board of Horticulture:

In this report I will say that fruit prospects and conditions were never better in the Fifth District. The planting of young orchards has been very great this season. Approximately there have been a quarter of a million trees planted within the year. The interest being taken in planting, cultivating and spraying is increasing at a rapid pace.

Cherries and apples predominate to a great extent.

The past winter has been the most favorable for a crop known in years, and if cold weather doesn't prevail later, the fruit crop will exceed any ever grown in the district, and will be far above the half million dollar mark with fair prices.

JUDD GEER,
Commissioner for Fifth District.

OCTOBER MEETING, 1907

To the Honorable State Board of Horticulture:

So far as the fruit crop of the Fifth District is concerned, apples are practically all sold, although packing is only fairly under way. The apple crop is a large one over the entire district, and prices are high, in fact higher than ever before, and growers are selling at $1.25 to $1.50 per box for four and one-half tier and larger, for the entire crop of all varieties. Both in quantity and quality the fruit is excellent.

Umatilla County is harvesting one of the largest and cleanest crops in its history, due in large measure to the vigilance of the county fruit inspector and the greater interest taken by the growers of that locality.

Prune driers are still running and will be for the remainder of the month. Prunes are an average crop and of good quality. Growers are receiving $12 to $15 per ton for fresh prunes at the driers, while some growers sold to shippers for a much higher price.

Pears were a good crop and were sold to shippers at from $40 to $50 per ton in bulk.

Crabapple Trees.
Home of M. J. Duffy, Cove, Oregon.

Cherries and peaches gave a light crop, but growers who were lucky enough to have a crop obtained good prices for them.

The growers' great trouble this season has been inability to secure help. At the present time apple growers are paying from $2.50 to $3 per day for ordinary labor, and men are very scarce at that high price.

JUDD GEER,
Commissioner for Fifth District.

APRIL MEETING, 1908

To the Honorable State Board of Horticulture:

Although the growers in this district did not receive as much as they expected for their apples the past season, on account of the car shortage and the panic which came just at marketing time, yet they received from 40 to 50 per cent more than ever before for their crops, so there is no actual reason for complaint.

Growers are rapidly adopting modern methods in regard to spraying and consequently are producing a better grade of fruit. In years past it has seemed to be the rule to see common and wormy apples in front of fruit stands and groceries, but this season it has been exactly the reverse. Spraying, which is practically becoming general, is doing away with worms, scale and other pests, but the grower must not stop here. There are entirely too many of the smaller, inferior grades of fruit on the market. The grower must attend to the thinning of the fruit on the trees if he expects to get the high grade that is possible and the quality that brings the grower profit. We must prune the trees so as to open them up to the sunlight in order to give the fruit the color and quality required for first-grade fruit.

The time is coming when Oregon will be known by its fruit as a State instead of by only a few localities.

The number of trees which are being set is something wonderful, not in just a few localities, but in every fruit-growing district in Eastern Oregon. Of course we must remember that not all of these trees are being planted by persons who will make a success of fruit growing, while on the other hand a great many planters are scientific, up-to-date fruit growers, and all such are a benefit to the fruit-growing industry of the State.

JUDD GEER,
Commissioner for Fifth District.

OCTOBER MEETING, 1908

To the Honorable State Board of Horticulture:

The fruit crop of the Fifth District for the season of 1908 is above the average in quantity and of excellent quality. There was a better and more determined fight against the San Jose scale in the localities where they have this pest than ever before, and there has been a more thorough campaign against the codling moth than in previous seasons, but there is yet room for a great deal of improvement on that line.

There are a few growers who practice thinning their apples while the fruit is small in such a manner as to reduce the number of apples to the tree and correspondingly increase the size of those remaining. This is the up-to-date method that makes for the production of large-sized fruit and is in vogue in many of the large fruit-producing districts of the world. In this district I regret to say that many growers refuse to adopt the method. Quantity seems to be their aim in fruit raising.

In Umatilla County prunes were a good crop and were sold at fancy prices. They were practically all shipped to the Eastern markets fresh. In Union County the crop was large and most of the fruit will be dried.

The cherry crop of the district was large in all localities. Cove alone shipped eighteen carloads.

There was about 50 per cent of a peach crop and prices were high through the whole season.

Pear prices were good, but the yield was not quite so heavy as last year.

JUDD GEER,
Commissioner for Fifth District.

IN MEMORIAM.

At a regular semi-annual meeting of the Oregon State Board of Horticulture, held at Portland, Oregon, April 8, 1907, the following resolutions were unanimously adopted:

Whereas, George H. Lamberson, then secretary of the Oregon State Board of Horticulture, was removed by death on the 4th day of December, 1906.

Be it resolved, That the State Board of Horticulture hereby records its sense of great loss; its appreciation of the valuable services rendered to this Board by Mr. Lamberson during the long period in which he performed faithfully and well the duties of secretary of this Board, and the personal sorrow of each member of this Board in losing a friend and fellow-worker.

Resolved, further, That the State Board of Horticulture hereby conveys to the family of the deceased the heartfelt sympathy of every member of the Board.

The secretary of the Board is hereby instructed to spread upon the records of this Board the foregoing resolutions, and to send a copy of the resolutions to the family of the deceased.

SPRAYS AND SPRAYING

Prepared for this Report by Prof. A. B. CORDLEY, *Entomologist of the Oregon Experiment Station, pursuant to a resolution adopted by the Oregon State Board of Horticulture, April* 13, 1908.

Knowledge of a multiplicity of sprays is not essential to success in spraying. Equipped with an understanding of the range of usefulness of three or four standard sprays, with a good spray pump, and with a determination to do thorough work one is as well fortified, as may be, against most orchard pests. Therefore this article will be brief. In practically all of the orchard spraying done in this State but three kinds of spray are used, and probably one of these may soon be largely dispensed with. To treat of more is but to waste time and space and to lead to confusion.

Most growers now understand that spraying is primarily to prevent loss from insects and from fungous diseases, and that a spray which is effective against one pest may be totally ineffective against another. Still, for the benefit of the novice, it may be necessary to emphasize the fact that there is no cure-all. Poisons like arsenate of lead or paris green are used to destroy codling moth and other insects which actually swallow plant tissues—usually caterpillars and beetles which feed upon leaves. They have little or no value as fungicides and are not effective against San Jose Scale, plant lice and other sucking insects. Bordeaux mixture is used to *prevent* attacks of fungous diseases and has but little value as an insecticide. Lime-sulphur is both an insecticide and a fungicide. Its range of usefulness is therefore greatly increased, but it is not a cure-all.

As intimated above, the three principal sprays in use in this State are arsenate of lead, Bordeaux mixture and lime-sulphur solutions.

ARSENATE OF LEAD.

Arsenate of lead is now the chief poison used in spraying for the codling moth, although paris green is cheaper and gives approximately as good results. Many brands of commercial arsenate of lead are now to be had, and so far as our observations go all are reasonably pure. The various brands may, however, be arranged into two definite groups which may be termed the acid arsenates and the neutral or normal arsenates. While the evidence is not conclusive, it appears to be true that the acid arsenates have some tendency to injure foliage and that they cannot so well be used

with the lime-sulphur solutions as can the neutral arsenates. While the available evidence upon the above points is not sufficient to justify one in condemning the acid arsenates, growers are advised to use neutral arsenates wherever possible.

Most manufacturers advise the use of three pounds of arsenate of lead to fifty gallons of water. The Washington Experiment Station has demonstrated that in the dry climate of Eastern Washington one pound to fifty gallons gives equally good results in controlling codling moth. We have found that two pounds are sufficient in the Willamette Valley. It is quite probable that one pound may be sufficient here, but since this has not been demonstrated we think it best to advise two pounds to fifty gallons for the more humid portions of this State.

Some growers prefer to prepare the arsenate of lead as it is used. This is but little if any more troublesome than to mix the prepared arsenates in water and should be somewhat cheaper. It can be readily prepared after the following formula:

Arsenate of soda	4 ounces
Acetate of lead	11 ounces
Water	15 to 20 gallons

Dissolve the arsenate of soda in two quarts and the acetate of lead in four quarts of warm water. When dissolved add them to the required amount of water.

This formula is especially valuable for spraying very delicate foliage or for use against insects which are killed only by large amounts of poison, since it can be used upon plants in much stronger solutions than the other food poisons without injury to the foliage.

If it is desired to use a combined insecticide and fungicide, arsenate of lead may be added to Bordeaux or to lime-sulphur solution in the same proportion as when water is used.

BORDEAUX MIXTURE.

Bordeaux mixture has been the principal preventive of fungous diseases. It is of some value as an insecticide, has a beneficial effect upon plants independent of its effect upon their insect and fungous parasites and may be used for most purposes in place of water in the preparation of the arsenical sprays.

Bordeaux for winter use may be made as follows:

Copper sulphate	6 pounds
Quick lime	6 pounds
Water	50 gallons

This is known as the 6-6-50 formula. It should be used only upon dormant trees. When the trees are in leaf the following 4-6-50 formula is used:

Copper sulphate	4 pounds
Quick lime	6 pounds
Water	50 gallons

For spraying peach foliage it is best to use the still weaker 3-6-50 formula:

Copper sulphate	3 pounds
Quick lime	6 pounds
Water	50 gallons

To prepare Bordeaux mixture dissolve the copper sulphate in hot or cold water in a wooden or earthen vessel. Slake the lime, using only sufficient water to insure slaking. The lime should not be allowed to become dry while slaking nor should it be submerged in water. After the lime is slaked add water and stir until the "milk of lime" is of the consistency of cream. The best results are obtained by diluting the milk of lime and the copper sulphate solution each to twenty-five gallons and then pouring these two dilute solutions together. The lime solution should always be strained through a seive to exclude particles that might clog the nozzles. A brass wire seive, twenty-mesh, large enough to fit the head of a barrel or the opening in the spray tank, will prove a great convenience.

When large quantities of Bordeaux are required, it is most convenient to make stock solutions of lime and of copper sulphate of known strength. A convenient stock solution of copper sulphate is made by dissolving 100 pounds in fifty gallons of water; one of lime, by slaking 100 pounds and diluting with water to fifty gallons. Each gallon of the stock solutions will then contain two pounds of lime or of copper sulphate and the amount to be used in preparing any quantity of Bordeaux acording to the above formulas can be readily computed.

If sufficient lime has not been used, or if that used was of inferior quality the Bordeaux may injure the foliage or may cause a "russetting" of the fruit. It is, therefore, always best to determine whether enough lime has been used by testing the mixture.

TESTING BORDEAUX.

There are three simple tests which may be used. First, hold a clean, bright knife blade in the Bordeaux for at least one minute. If it becomes copper-plated more lime should be used. Second, pour some of the Bordeaux into a shallow dish and holding it up to the light blow gently across its surface. If properly made a thin pellicle will form on the surface of the liquid. Third, dissolve one ounce of ferrocyanide of potassium in five or six ounces of water. Pour some of the Bordeaux into a white dish and add to it a few drops of the ferrocyanide solution. If sufficient lime has been used no change will be noticed. If a brownish-red discoloration takes place, more lime should be added.

Unfortunately, even the most carefully prepared Bordeaux will sometimes cause serious "russetting" of the fruit. This russetting seems to be most serious when rainy or at least humid weather

prevails at the time of the first spraying after the blossoms fall, and as such conditions do usually thus prevail, at least in the Willamette Valley, "spray injury" following the use of Bordeaux often becomes almost as serious as the fungous injury it was expected to prevent.

LIME-SULPHUR SOLUTION.

One application of lime-sulphur spray each winter will do more for the neglected orchard than can be done in any other way by the same expenditure of cash and energy. It not only destroys San Jose scale, but it also destroys the branch form of woolly-aphis, the eggs of the green-aphis, the pear-leaf blister mite, the hibernating larvæ of the prune twig-miner, probably the hibernating larvæ of the bud-moth, together with most other insects which may chance to be wintering upon the trees. It is also a good fungicide. If applied in fall it is nearly or quite equal to Bordeaux as a preventive of apple-tree anthracnose; applied to peach trees just before the buds open in spring it is a preventive of peach-leaf curl. The results of the past three seasons' work at the Oregon Experiment Station also show that when diluted it can be used as a substitute for Bordeaux mixture for spring and summer spraying with exceedingly good results.

There are two methods of preparing the lime-sulphur spray. The formula which has been most generally used in this State is as follows:

Quick lime	50 pounds
Sulphur	50 pounds
Water	150 gallons

Slake the lime thoroughly, add the sulphur, and boil briskly for at least an hour or until the mixture is of a deep, blood-red color with but little free sulphur on the surface. Add water to make 150 gallons.

The "stock solution" method which is now most generally used in this State has been developed during the past three years. During that time there have appeared upon the market a number of brands of concentrated lime-sulphur solutions which have only to be diluted with water to be ready for use. Careful experiments extending over three seasons have demonstrated that these sprays are fully equal to the old home-made lime-sulphur spray in destroying San Jose scale. Whether all of them can safely be used for summer spraying is yet to be demonstrated.

The chief fault to be found with these commercial preparations is that they cost too much. The retail price is $9 to $12 per barrel of fifty gallons. The lime and sulphur necessary to prepare fifty gallons of stock solution which is equally as efficient costs at present retail prices approximately $3. It may be prepared as follows:

Sulphur (best finely ground), one sack	110 pounds
Lime (best grade, unslacked)	60 pounds
Water, sufficient to make	60 gallons

Slake the lime, mix the sulphur into a thin paste with a little water, add it to the lime, add sufficient water to make sixty gallons; bring to a boil and boil vigorously for an hour. The sediment is then allowed to settle, after which the clear, dark, amber-colored liquid is drawn off and may be stored in casks for future use.

Every grower who expects to prepare his own spray by the stock solution method should provide himself with a Beaume's acid scale hydrometer. Such an instrument, which should not cost over $1, furnishes a very simple and convenient method of testing the strength of the solution. A "stock" solution prepared as above described should test not less than 26 and might test 30 upon such a scale. Should it test 26 it may be diluted at the rate of one gallon to ten gallons of water for winter spraying; should it test 30, twelve instead of ten gallons of water may be used. Further experiments are necessary to determine at what strength such solutions may be safely used upon various trees in foliage, but the experience of the past two seasons indicates that one to twenty may be safely used upon the apple and other hardy plants. Upon the peach the dilution should probably be somewhat greater. These dilutions for summer spraying apply only to stock solutions which are prepared according to the above directions. The various commercial lime-sulphur sprays I have not tested for summer use.

While the above three sprays are the only ones generally used in orchard practice in this State, other sprays are occasionally needed, principally for destroying such insects as the various plant-lice, apple-tingis, etc. For this purpose there is probably nothing better than kerosene oil emulsion.

KEROSENE EMULSION.

Kerosene oil, or coal oil, is a powerful insecticide. The undiluted oil is, however, liable to seriously injure plants to which it is applied. This difficulty is overcome by using one of the special spray pumps which have been devised for the purpose of mixing the oil with water in any desired proportion; or by forming an emulsion with some substance that may be readily diluted with water. Soap is most commonly used for this purpose, as follows:

Kerosene oil	2 gallons
Hard soap (preferably whale-oil)	½ pound
Water	1 gallon

Dissolve the soap in the water by boiling. Add the suds, boiling hot, to the oil. Churn the mixture violently with a spray pump until it becomes a thick, creamy mass. If perfectly emulsified, the oil will not rise to the surface even after standing an indefinite time. Such an emulsion may be used immediately or may be kept as a stock mixture. Before using dilute one part of the stock emulsion with ten to fifteen parts of water.

This will be found to be an efficient remedy for green aphis, woolly aphis, red spider, mealy bugs and certain scale insects.

WHALE-OIL SOAP AND QUASSIA.

Strong soap suds made from any good soap are useful for destroying soft-bodied insects like plant-lice. It is usual, however, to employ for this purpose special soaps made with fish-oils and sold as whale-oil soaps. These vary considerably in composition, some being made with soda, others with potash lye. The latter are much superior and buyers should insist on having potash soaps.

For scale insects, whale-oil soap is sometimes used in as concentrated a solution as two pounds of soap to one gallon of water, but only upon dormant plants. As a remedy for the various plant-lice one pound of soap to eight or ten gallons of water is usually sufficient. Hop growers are inclined to believe that better results are obtained, when spraying for hop-lice, by adding some quassia decoction to the soap solution, as follows:

Whale-oil soap	10 pounds
Quassia	5 pounds
Water	100 gallons

Place the quassia chips in a sack, cover with eight or ten gallons of water and soak twelve to twenty-four hours. Then bring to a boil, remove the chips, add the soap and boil until it is dissolved. Add water to make 100 gallons. The whale-oil soap and quassia spray is used principally by hop growers.

BLACK LEAF SHEEP DIP.

Black leaf sheep dip, a proprietary tobacco preparation, may be used for the same purpose as kerosene emulsion or whale-oil soap and quassia and has the advantage that it does not injure foliage and is ready for use. One gallon diluted with 75 to 100 gallons of water makes a very efficient aphidicide.

WHEN TO SPRAY.

General directions as to how many times to spray and when the applications should be made are at best unsatisfactory. The answer to both questions depends not only upon the variety of fruit to be sprayed, but also upon the conditions prevailing in the orchard to be sprayed, and the relative importance of the orchard crop to other crops. The orchardist can afford to do more spraying than can the farmer.

An almost universal practice in this State—and a good one—is to spray the orchard, whatever the kind of fruit, with lime-sulphur at some time while the trees are dormant. While this application is made primarily for San Jose scale, I believe there is no other which has such a generally beneficial result. It is the annual "house-cleaning" of the orchards.

The best time for this winter spraying is immediately after the leaves drop in fall—even before they are all off—or just before the

buds open in spring. Personally, I prefer the latter, but attention should be called to the danger of unfavorable weather conditions at that time and to the consequent inadvisability of delaying the work too long.

All other sprayings are for special purposes and can best be considered in connection with particular pests.

APPLE.

APPLE SCAB.

Spray with Bordeaux or with lime-sulphur (1-20): first, when the blossoms are beginning to unfold; second, immediately after the blossoms fall; third, ten days or two weeks later. (If the trees were sprayed with winter strength lime-sulphur solution before the buds started, the first of the above applications may be omitted. If prolonged rainy weather follows the third spraying, a fourth two weeks later may be profitable.)

CODLING MOTH.

Add arsenate of lead or paris green to the second scab spray. Endeavor at this time, by the most thorough work, to fill the blossom end of every apple with the spray. If this be well done, and if the fruit be again thoroughly sprayed late in June, fairly good results may be obtained without further applications. It is our experience, however, that in the Willamette Valley at least, it usually pays to spray once or twice for the second brood. The first of these applications should be about August 1; the second some three or four weeks later. While thorough work should be done at all times particular emphasis should be placed upon the two first sprayings. If all of the first brood larvae could be killed there would be none of the second.

SAN JOSE SCALE.

Spray in winter with lime-sulphur, either immediately after the leaves fall or before the buds start in spring. Do thorough work. Soak every part of the tree.

APHIDS OR PLANT LICE.

(*Woolly-aphis, Green-aphis, Brown-aphis, Black-aphis.*)

The plant lice rarely if ever become troublesome in orchards which receive an annual winter spraying with lime-sulphur. Dilute kerosene emulsion or black-leaf sheep dip applied just after the leaf buds start or at any time the aphids become troublesome, is also effective.

APPLE TINGIS.

Practice clean culture, clean up and burn all rubbish about the orchard. Spray when eggs are hatching in late May or early June with kerosene emulsion or black-leaf sheep dip.

APPLE TREE ANTHRACNOSE.

Spray with Bordeaux or lime-sulphur soon after fall rains begin or at least as soon as fruit is picked. Spray again with lime-sulphur as soon as leaves have fallen.

CHERRY.

SHOT-HOLE FUNGUS.

Spray with Bordeaux or lime-sulphur when blossoms are opening, and again when petals have fallen.

CHERRY SLUGS.

Spray with arsenate of lead whenever they become troublesome.

BLACK APHIS.

See under "Apple."

SAN JOSE SCALE.

See under "Apple."

CHERRY GUMMOSIS.

No satisfactory remedy known. The best that can be done is to prune and burn dead branches, cut out gum-pockets and wash or spray wounds with Bordeaux.

BROWN ROT.

See under "Peach."

PEACH.

PEACH LEAF CURL.

Spray thoroughly before buds open with Bordeaux or lime-sulphur.

PEACH BLIGHT.

Spray with Bordeaux or lime-sulphur soon after fall rains begin or immediately after late fruit is gathered.

PEACH FRUIT SPOT.

Spray same as for blight. Also spray once or twice in late May and June with weak Bordeaux or lime-sulphur. Do not make these applications during rainy weather.

BROWN ROT.

Destroy all rotting fruit. Spray as for blight. If disease still persists spray with dilute lime-sulphur when fruit is ripening.

SAN JOSE SCALE.

See under "Apple."

PEAR.

PEAR SCAB.

See under "Apple Scab."

CODLING MOTH.

See under "Apple."

SAN JOSE SCALE.

See under "Apple."

PEAR SLUG.

See under "Cherry Slug."

PEAR BLIGHT.

This is the most destructive disease of the pear; it also attacks the apple and other related trees. Extreme care and thoroughness are necessary in dealing with this disease. Examine trees carefully and repeatedly during the winter and cut out and burn every particle of hold-over blight that can be detected. Examine not only branches but trunk, and even roots. Sterilize tools frequently with solution of corrosive sublimate.

PEAR-LEAF BLISTER MITE.

Spray with lime-sulphur just as buds are starting.

PLUM AND PRUNE.

BROWN ROT.

See under "Peach."

SHOT-HOLE FUNGUS.

See under "Cherry."

SAN JOSE SCALE.

See under "Apple."

APPENDIX

APPLE-GROWING IN OREGON.

By Hon. W. K. Newell, *President of the Oregon State Board of Horticulture.*

The purpose of this article is to present briefly some of the fundamental principles of apple growing as they apply in a general way to the industry in this State. To give detailed instruction for a given locality is not a difficult matter if one is familiar with the conditions, but to go into details for so large and so diversified a country as Oregon is impossible.

Apples of the finest quality can be grown in every county in Oregon, provided varieties suitable to the locality are selected and the requisite care is given the orchard. It must be kept in mind that there is no other fruit grown that requires so full and complete knowledge of detail to bring it to the highest degree of perfection. General principles will apply everywhere, but there are local conditions and methods of practice that must be mastered, and can be acquired only by close observation and experience. To forcibly illustrate this point it is necessary to refer only to one instance in Oregon. The two districts of Milton in Umatilla County and Cove in Union County are only about fifty miles apart, and yet so different are the climatic conditions that there is a difference of thirty days in the time of ripening of the same varieties of fruit.

LOCATION AND SOIL.

The apple adapts itself to a wide range of soil conditions. The safest and best rule is to observe trees that are already planted in your chosen neighborhood. The soil must be well drained, naturally or artificially, and be of good depth and quality. Trees may grow nicely for a number of years in light, thin soil, but when the heavy strain of maturing crop after crop of apples comes there must be depth and substance or the results will be unsatisfactory. Do not be deceived in the choice of soil, but investigate closely; dig or bore holes to determine depth, and observe the vegetation to determine quality. The apple is already so widely planted that there is no difficulty in observing its habits in any locality.

PREPARATION OF SOIL.

Thoroughness in every detail must be the watchword of the apple grower, and it can not be too strongly impressed on the mind. If the land is newly cleared, cultivate it at least one season in potatoes or corn before planting the trees. Plow deeply, and, if old wheat land, or similar soil, subsoil by all means. Harrow until in fine condition. Never plant an orchard until the land is in first-class condition. You can not properly fit it after planting.

TIME TO PLANT.

The apple tree can be safely planted at any time when the soil is dry enough from November 1 to May 1 in the greater part of Oregon, but November is unquestionably the best month. The young tree is sufficiently ripened by that time to be removed, and if planted at that time it will be well established in place and its roots will be calloused ready for growth

in the early spring. February is the next best month for planting. The tree which is planted late in the spring is too often dry and damaged by exposure, and it pushes forth its buds and new growth before the roots are established; the result being total loss of the tree, or at best a feeble growth and a weak tree.

DISTANCE BETWEEN TREES.

Apple trees are usually planted too close together. As a general rule they should not be closer than from thirty to thirty-two feet. Whether to use the square, diagonal or hexagonal system in planting is purely a matter of individual preference. If one wishes to fertilize heavily and prune severely, keeping his trees headed low and dwarfed as much as possible, the trees may be planted as close as twenty feet, but as a rule this is not advisable. Close planting may bring quicker returns but it also brings quicker exhaustion.

VARIETIES TO PLANT.

Here again it is impossible to give definite advice. Plant what experience has proven best for the locality and what others are planting, that the market question may be the easier solved. Give preference always to the apple of quality rather than to the one solely of quantity. The time is coming, if it is not already here, when the public taste will demand quality as well as fine appearance. A big yield, even at a low price, may pay at first, but if the fruit is of low quality it can not win in the long run.

We have planted on this coast almost exclusively varieties that originated on the Atlantic Coast or in the Mississippi Valley. While these varieties have generally done well here and have produced fruit superior to that grown in their native home, still I firmly believe that we can produce varieties of our own that will be better than those we now have. The field is open to the experimenter and originator, and the reward should be great for the man who can develop an apple of such merit that it will become the apple of his district.

AGE OF TREE TO PLANT.

By all means plant only yearling trees. You can head them down where you want to start the heads and by proper training secure a low-headed tree that you can cultivate close up to, and that will be practically self-supporting under a load of fruit. The nurseryman, catering to the demand for big trees, heads his two-year-old trees so high that they are ruined for the practical orchardist.

SETTING THE TREE.

Having dug a good hole thirty inches wide and twenty inches deep, and put some of the surface soil in the bottom, you are ready to plant the tree. Prune off all bruised, broken and dry roots and cut back all others to four or five inches in length, making a sloping cut on the bottom of the root with a sharp knife. Tramp the dirt very firmly with the feet, especially in the bottom of the hole next the roots. Set the tree two or three inches lower than it stood in the nursery row. This is very important. In dry land set it still deeper. If the tree roots are dry, or the day dry and windy, prepare a mud bath in a bucket or tub and set the trees in it and haul along on a sled as you plant. Great care should be taken to properly line out the rows in order that they may be straight. If necessary get a surveyor, but it can be done if land is not too rough and uneven by setting plenty of stakes for sights and having a man stand at the end of rows and sight while planting is being done. On hillsides use hand-level and plumb-bob to make accurate measurements.

CAUGHT BY THE BOARD'S CAMERA IN AN OLD OREGON APPLE ORCHARD.

CULTIVATION.

Here is where failure usually comes. If the young tree is to grow, the cultivation must be thorough. The weeds must be kept down and the ground moist. The tools necessary are a plow, harrow, extension disc harrow, a "Kimball" cultivator and a plank drag. The ground should be stirred with one of these implements at least once in every ten days during the growing season. For young trees cultivation should cease about August 1; for bearing trees about August 20.

COVER CROPS.

Next in importance to cultivation, and a necessary adjunct to it, is the winter cover crop. Constant cultivation in summer without a cover crop for the rainy season is even more wasteful than the old summer fallow for wheat. The common vetch is the best cover crop for Western Oregon conditions and for those portions of Eastern Oregon which do not have severe winters. The seed should be sown at the rate of about forty pounds per acre in the latter part of August or early in September. It may be sown at the time of the last cultivation. It must be sown early in order to acquire sufficient growth to be turned under early in May. Where the winters are cold and conditions are not favorable for the common vetch, the hairy vetch may be substituted for it. The vetch being a leguminous plant will gather sufficient nitrogen to supply the needs of the orchard, and will provide humus so that moisture can be held throughout the dry season. Where this system has been followed for three or four years I have seen in the middle of August the soil so moist just below the surface that it could be squeezed into a compact mass in the hand.

After a good growth of the trees has been obtained or when they are four or five years old the cover crop may be allowed to grow one summer instead of being plowed under. This will tend to check wood growth to some extent and to induce the formation of fruit buds. The heavy mulch will retain as much moisture as is necessary and the crop will re-seed itself.

SPRAYING.

This subject is covered in detail in another part of this report, but I will give here a few special instructions regarding the apple. At the present time one is reasonably sure of getting good, clean stock from the nurseryman; but personal attention should always be given to this point, and if there is any reason for suspicion the stock should be fumigated, dipped or sprayed before planting. Then keep it clean by continued spraying; don't wait for it to become infected with all kinds of trouble before beginning to spray. Every young apple tree should have a good annual spraying with lime and sulphur. The best time to apply this is early in November or at latest just as early as the leaves fall. The scale can be killed easier at that time than at any other and the spores of fungous diseases can be reached at the same time. When the trees come into bearing they should have another spraying with lime and sulphur just before the buds open in the spring. This is to prevent apple scab, and is very essential for this purpose.

For the codling moth the first spraying with two or three pounds of arsenate of lead to fifty gallons of water should be applied within five to ten days after the blossoms fall. The apples at this time are pointing up and the calyx end is still open so that the cavity can be filled with poison awaiting the coming of the worm several weeks later. This spray should be applied with a coarse nozzle like the Bordeaux, and be sprayed directly against the end of the apple with great force. To do this have a bend in the end of your spray rod, and if the trees are very high use a tower and get up above your tree. Great thoroughness is absolutely essential in this

YELLOW NEWTOWN APPLE ORCHARD OF CHRIS. DETHMAN. HOOD RIVER, OREGON.

work, for one apple overlooked may mean several hundred worms in August and September. The second spraying for codling moth should be given about June 25 to July 1 and a third August 1 and a fourth about September 5 to 10.

PRUNING.

There are many different ways of pruning the apple tree: high head or low head; open center or full center, etc. Unquestionably the low-headed tree is the best. The high tree can neither be sprayed thoroughly nor can the fruit be thinned or gathered economically. In setting out the tree head it back to 18 inches from the ground, and a right start will have been made. Further explicit directions can not be given, for no two trees will grow exactly alike; each must be treated according to its individual needs. It has been said that a tree will never grow a limb just where or how you want it.

Aim to grow a tree that will support itself just as nearly as possible; avoid all Y or V-shaped crotches and do not cut all the center out under the mistaken idea that it is necessary to do this to let in the sunlight. A well loaded tree will bend under the weight of the fruit until it will open up the center all that is necessary. A tree with the center all cut out is already deprived of its natural support and artificial aid must be provided from the start.

THINNING THE FRUIT.

Apples need more or less thinning every year if a large percentage of first-class fruit is to be obtained. With the Spitzenburgh thinning is absolutely essential to procure perfect development. The general rule is to leave only one apple in a place, and far enough apart so they will not touch at maturity. This will require from four to six inches of space, according to the size of the apple. Hand-thinning should be done early, as soon as the crop is well set and nature has completed her process of thinning. The work may be done with the fingers without the aid of any instrument by merely bending the small apples sharply back as in regular picking; but the work is best accomplished by the use of small shears made especially for the purpose. These shears were used by a number of orchardists last season and can be obtained at leading hardware dealers this season. It is contended by some that this is too much bother and expense, but those who are doubtful are urged to give it a trial on a few trees at least. Note carefully the cost and the benefit. These surplus apples must be picked some time, and it can be done cheaper at thinning time in June than at picking time in September or October. The remainder given opportunity for full development will equal in quantity and surpass in quality the unthinned fruit.

PICKING.

It is difficult to tell just when to pick an apple. Experience can be the only guide. Weather conditions enter largely into the question, as it is certainly better to pick a little early when a storm is threatening than to risk the loss from wind and rain. Fruit for storage and long keeping must be picked before full maturity is reached. Correct storage being merely a process of keeping the apple from ripening, it is plain the apple must not be fully ripe at the beginning. Fruit that is to be marketed locally or early in the season can be left upon the trees much longer, thus securing higher color and fuller flavor. A safe general rule is to pick as soon as sound fruit begins to fall from the tree in normal weather, and when the seeds are well browned; although these two conditions are not always simultaneous.

Spitzenberg Apple Tree in Orchard of A. I. Mason, Hood River, Oregon. Photographed August, 1908.

There are many picking devices, patented and otherwise, but perhaps the most generally satisfactory way is to use deep, galvanized iron pails holding twelve or fourteen quarts and a stout hook to hang them to a limb. The one point of prime importance is to get the apples gathered without bruising, and to do this they must be handled like eggs and not poured like potatoes. With the buckets the foreman can instantly tell by the sound if a picker is dropping the fruit into them. In emptying, the bucket is set down next the box and with both hands the picker or sorter quickly transfers the fruit. If sufficient help is at hand the fruit can be sorted more quickly and cheaply at this time than at any other. Apples should be cool as possible when hauled to the packing shed or storage room. When weather conditions will permit, it is a good plan to do the hauling in the morning, leaving the afternoon picking stacked up under the trees to cool over night.

The best ladders are the self-supporting styles of stepladders. Do not use a ladder that must be leaned against the tree except for the apples high in the top that can not be reached otherwise, and then only after the others have all been gathered.

HAULING.

A low truck with a solid, wide platform sloping slightly to the center so the boxes will not slide off, is the most convenient vehicle for hauling the boxes from the orchard to the packing shed. If to be hauled any distance, as to the shipping station, bolster springs should be provided.

PACKING.

The first step is sorting and wiping. Provide the sorters with cotton gloves or mittens made of Turkish toweling, and they can wipe all apples that need it as they sort. It is not advisable to wipe the apple unless they are dirty or marked with spray. Grade to three or four sizes for convenience in packing. About equal quantities of the two sizes of boxes, the "standard" and the "special" will be needed. The paper required is the lining paper, pink, red or white, as preferred, the blue cardboard for layers and an assortment of wrapping paper; 10x10 sheets for the largest apples, 8x10 for medium and 8x8 for small. Only first-class apples should be wrapped, and the cardboard need be used only for long distance shipment or storage. The diagonal pack, the two two, and three two, should be used wherever possible, as the fruit is bruised less by this method than by any other, and also it is easier to secure a firm pack and a proper bulge to the box. Good packing requires training and experience, and is nearly-one-half the battle in marketing the fruit. A nailing press is essential in nailing on the box covers.

MARKETING.

Wherever possible this should be done through a fruit growers' union. The individual, unless he has a very large orchard, is at a disadvantage; the reasons are too obvious to need mentioning in an article of this kind. The matter is no longer an experiment; the details have all been worked out by the several strong organizations now in existence in the State, and the beginner can get all the information necessary.

Rome Beauty Apple Orchard, C. H. Finn, La Grande, Oregon.

LAMBERT CHERRIES.
Photographed at Webb Farm, Troutdale, Oregon. Right to reproduce illustration retained by Webb Farm.

CHERRY CULTURE IN OREGON.

By Hon. R. H. Weber, *Commissioner of the Oregon State Board of Horticulture for the Fourth District.*

The steady growth of commercial orcharding has broadened a field of action in the Pacific Northwest in which many thousands of energetic men are doing successful work, and the ranks of the fruit-growers are being constantly augmented by enterprising and progressive men who are attracted to this coast by this rapidly developing and profitable industry from all parts of the Eastern States. The quality of our Northwestern fruit has so firmly established it in the homes of Eastern people that it may now be considered one of the staple articles of diet and no longer a luxury, thus creating an ever-increasing demand and assuring us a good market for our orchard products, whether fresh, evaporated or preserved.

To the cherry, however, belongs the distinction of being more exclusively a Pacific Coast production than any other of the many varieties of deciduous fruits grown here, which makes cherry-growing a most striking feature of the coast region horticulture. Owing to the limited areas suitable to cherry-growing, an over-production of this luxurious fruit can hardly be considered even among the possibilities of a good many years to come. At the present time, at least, the demand is greatly in excess of the supply and is increasing much more rapidly than the production, which is the incentive for the rapid extension of the industry.

The varieties of cherries in cultivation consist of two distinct classes or sorts; the first, comprising the Hearts and Bigarreaus, commonly designated as sweet cherries, is characterized by an unusually upright growth and pyramidal form of tree, and by a decidedly sweet flavor of the fruit.

The second class includes the Dukes and Morellos, commonly called the Kentish or pie cherries. They are of a decidedly acid flavor and have little or nothing to recommend them to the commercial cherry-grower.

Great care should be exercised in the selection of soil, exposure and drainage for a cherry orchard, as much of the future success of the business depends on a proper location. In the coast region, west of the Cascade Mountains, a deep, light loam, with a south or southeast exposure has been found to be the most desirable, while in the Inland Empire region, east of the Cascades, they thrive best on sandy or gravelly soil, and there they attain their highest perfection; but they will do quite well in almost any situation except a very wet one or in very heavy clay. A south or southeast exposure should be selected, as it will be found that on this slope the trees mature more perfectly and are less subject to gummosis than on the heavier soils of a north or northwest slope, where the growing season is certain to continue longer on account of the greater retention of moisture, which is quite sure to prove detrimental.

The cultivation and irrigation, if the latter must be resorted to, of a cherry orchard should be so regulated and calculated that the wood growth of the tree will almost cease with the harvesting of the crop, causing the tree to stand practically dormant during the remainder of the season. This system, which refers to mature trees in full bearing only, will be found to be most valuable in preventing gummosis, for it is in the orchards where strong wood growth is encouraged throughout the summer after picking

(No. 1.) Royal Ann Cherry Tree, 20 Years Old, in Bloom.
Orchard of R. H. Weber, The Dalles, Oregon. (See No. 2.)

(No. 2.) Royal Ann Cherry Tree Shown in No. 1 as It Appears when Loaded with Fruit.

time, either by cultivation or a naturally moist condition of the soil, that this disease is most prevalent. Young trees, before they come into bearing, may be cultivated much later, encouraging wood growth as much as possible, as they are much less subject to gummosis on account of a more even distribution of the sap and not being subjected to the shock of being forced to absorb the surplus nourishment which had been consumed by the fruit during the process of its growth and development prior to ripening and gathering. Cherry-growers everywhere should put this system into practice as much as possible during the coming season and report the results of their experiments.

Cherry culture in general should be given more attention at horticultural meetings, as much good would result and the industry would be greatly benefited by an exchange of opinions and a thorough discussion of the subject. It is quite unfortunate, and to the beginner and prospective cherry-grower somewhat discouraging, to find so little literature available for his instruction and guidance, and a suggestion from our State Horticultural Society and the Northwest Fruit Growers' Association to the Departments of Horticulture of both the United States and Canada to have experts make scientific investigations pertaining to this rapidly developing industry for the benefit of those already engaged in the business and those who contemplate entering the ranks to become cherry-growers, should not be amiss.

With the exception of gummosis, which can in a great measure be controlled by judicious cultivation, the cherry is perhaps less subject to the attacks of insect pests and fungous diseases than any other kind of fruit, resulting in a cheaper and necessarily more profitable production.

While spraying with Bordeaux is recommended to prevent and control gummosis, its application will be found to possess less merit than is generally supposed, and much more good will be accomplished in this direction by the selection of a proper location and subsequent cultivation. The impression should not obtain from the foregoing that spraying of cherry trees is entirely useless and to be discouraged, for a thorough application annually of the sulphur and lime solution or Bordeaux mixture is very beneficial and should be regularly practiced, inasmuch as it destroys the eggs of the brown aphis, which sometimes attacks the tree, besides acting as a general cleanser, giving tone and vigor to the bark of body and limbs.

One-year-old trees, well grown and thrifty, propagated on Mazzard or Mahaleb stock, are to be preferred by the planter. Heads should be formed rather low, to prevent sunscald to its sensitive bark. The methods of growing and training a young cherry orchard are similar to those employed for other varieties of fruit. Heading back the limbs to give proper shape and balance to the trees should continue for three or four years, or until they come into bearing, when it will be found, if the orchard is properly handled, pruning is rarely needed, but may be resorted to, if deemed necessary, without injury to the tree, for it does not induce gummosis, as is often claimed, at least not in Eastern Oregon, where cherry orchards are grown almost exclusively without irrigation.

In removing the small branches when forming the head, care should be taken to always make the cut just above a bud at an angle of 45 degrees with the branch; should the cut be made just back of a bud or midway between buds, the wood is apt to die to the next bud below and thus have a tendency to interfere with the proper shaping of the tree.

By the introduction within recent years of many new varieties of great merit, the cherry industry has been practically revolutionized, and the season of ripening extended by at least a full month.

The great call for Royal Ann by canneries and Maraschino people has stimulated the planting of this variety, until today it is far in the lead of all other kinds, and with the building of new canning plants in all portions

of the Northwest a still greater demand for this sort may be expected and should be anticipated by largely increased plantings. The Royal Ann is also a good shipper, bringing good prices in Eastern markets. Next in order as a canning cherry is the Centennial, a new cherry and a seedling of the Royal Ann. It is larger and firmer than its parent, which makes it more desirable for a long-distance shipper. It is the first cherry to ripen, suitable for long-distance shipping, which adds greatly to its commercial value, and should therefore receive much more recognition from planters than has been the case in the past. For exclusively fresh consumption and long-distance shipment Lambert, Bing and Black Republican are in the lead in the order named, and can be shipped to our Atlantic Coast cities and under refrigeration to Europe with perfect safety. Evaporated cherries are regularly quoted in the markets at high prices, indicating a strong demand for the fruit in this condition.

It is a singular coincidence that all but one of our leading commercial varieties are of local origin; the birthplace of Black Republican, Bing and Lambert being Oregon, while the Centennial comes to us from California.

There are other desirable sorts which have originated on this coast, such as Deacon, Hoskins and Windsor, which, though valuable sorts, have so far received less recognition from commercial orchardists. There is still room, however, for more new varieties of merit, and the early and late season might and probably will be extended by the introduction of sorts that will make it possible to ship cherries from the middle of June to the last of September or the middle of October.

I would like to say about the gummosis, that in all irrigated districts it is largely caused by too much irrigation. Where the land never gets too much water the trees never have the gummosis at all and still bear a good crop.

R. H. WEBER,
Commissioner for Fourth District.

PEACH-GROWING IN OREGON.

By Hon. A. H. Carson, *Commissioner of the Oregon State Board of Horticulture for the Third District.*

The peach can be grown in many locations on the Pacific Coast, at least in nearly all cases the family can grow a few peaches for the home with care if the location is properly chosen. Where commercial peach-growing is desired the question of location near shipping points must be considered, as the peach is a tender fruit, and will not stand a long haul over bad roads and reach market in prime condition.

SOILS ADAPTED TO GROWING THE PEACH.

In Southern Oregon nearly all of our red-hill loam soils are adapted to peach-growing, provided they have the necessary depth, not less than two feet, free from float rock so that good cultivation can be done. It is important in choosing a location for a peach orchard to have the orchard on ground two to three hundred feet above the valley adjacent thereto, as such locations are usually naturally drained, and through air drainage are not as liable to the injury of the bloom during spring frosts. These high locations are always warmer during a frosty period than ground on lower levels.

PREPARATION OF SOIL FOR PLANTING.

Ground just cleared should be farmed in some crop a year or two before planting the young trees. This is done to take the general rawness out of the new soil and permit the soil to decay and make available the plant food in the soil for the young peach tree.

PLOWING.

The best results with the young peach orchard will be had if the ground is carefully and thoroughly plowed and the surface soil well fined with the harrow; in fact, the grower will find he will be well repaid for his extra labor if he subsoils his land before planting his young peach trees. With a turning plow turn over the soil to a depth of eight inches, following up each furrow with the sub-soil plow, breaking up the sub-soil eight inches deeper. Soil thus plowed facilitates drainage in case of heavy rains, drawing the water falling during a rain through the soil to drain off through the furrow made by the sub-soil plow, in place of draining off over the soil surface, carrying with the surplus water the plant food you need for the young peach tree. The sub-soiling of the ground is not only a means of conserving moisture during cultivation, but it is a fertilization of the soil as well during rainy periods.

AGE OF TREES TO PLANT.

I would always plant one-year-old trees, trees that had not been pruned in the nursery.

DISTANCE TO PLANT.

The standard distance to plant has been, in Southern Oregon as well as other points on the coast, 16½ by 16½ feet. I regard this distance too close

for the peach. You will get more satisfactory results, with a higher grade of peaches, to plant your young trees 20 by 20 feet apart, 108 trees to the acre. This distance gives ample room for the tree to draw its nourishment from and gives you ample room to bestow the necessary cultivation. Plant the trees the same depth they stood in the nursery, pruning off all broken and bruised roots with a sharp knife, packing the fine earth firmly around the roots.

TIME TO PLANT.

In this climate I would prefer fall or early winter for planting. The winter rains pack the earth around the rootlets, and the roots callous and heal over before spring, the period when growth begins. I have noted that trees planted in the fall or early winter always make a better growth than if planted in the spring.

CULTIVATION.

It would be useless to attend to all other details in planting a peach orchard and expect success without good cultivation. Good, careful cultivation during the season of growth is very important. The soil should be stirred often with harrow or spring-tooth to prevent the growth of weeds and conserve moisture.

PRUNING THE PEACH.

Aside from cutting back the young tree when first planted, the first year there will be no necessity for pruning excepting the February following, when, should the growth be too thick, it should be thinned out to admit sunlight and air and to preserve symmetrical proportions and balance of the young tree.

After the first year's growth, the second year's growth will be the time when you should begin annual pruning for the purpose of growing fancy peaches, and, too, to prolong the life and vigor of your peach trees. To become an expert pruner of the peach, the pruner must know and understand the characteristics of the growth of the peach. First, it must be remembered that the peach bears its fruit on the annual growth of the preceding year; that the yearly growth must be had each year, or there will be no fruit buds for the fruit the year following. You have, no doubt, noted than an old, unpruned peach orchard bears what little fruit it produces each year on the extreme ends of its limbs, and the space from the ground to the terminal fruiting spurs are bare, with dead twigs and worm-eaten limbs showing decay, and a gradual dying of the tree. Why do peach orchards five to six years after planting present this apeparance? Because of the want of intelligent annual pruning. If you please, let us take the annual growth of a peach twig and examine it—its fruit-buds and leaf-buds. You will note on close examination that the terminal bud is a leaf-bud, strong, large and vigorous, that the buds down the twig are single and compound, that some are fruit-buds, single and compound. In case of compound fruit-buds, you will always find a leaf or wood-bud between them. Now, you will note these buds beginning at the terminal bud down the twig are strong, vigorous buds down to near the lower part of the twig; here you will find, near the base of the twig, a number of flat wood-buds. These flat wood-buds are weak buds, and unless stimulated by intelligent pruning perish with the annual growth of the peach. This perishing of these weak wood-buds annually is the reason that from year to year the fruiting of an unpruned peach tree is annually extended to the terminal branches of the peach tree, and the intervening space becomes bare of growth and unproductive, and the unpruned tree begins to die. As a rule an unpruned peach tree will not be productive and will not pay to gather the fruit after six years old.

Under proper management and intelligent pruning a peach tree can be made a long-lived tree, and should, if properly pruned, be as healthy and vigorous at ten years old as when a three-year-old. This condition can only be had by annual pruning. The rule to follow in pruning the peach is: Always keeping in view symmetrical proportion and balance of the tree, cut out half of all the annual growth of new wood, and of the balance of new growth shorten in half. By following this method of pruning the peach you will have pruned out three-fourths of the annual growth, and will have thinned the fruit so that over-bearing will not occur, and you will have stimulated the weak buds at the end of the base of the twig into growth of new wood for next year's fruitage. By this method of pruning you will have stimulated a healthy growth through all parts of the tree, shading from the sun the larger limbs with a vigorous foliage that protects them from sun-scald, which, if it occurs, always impairs the vigor of the tree.

It frequently occurs that the cutting out of three-fourths of the annual growth of the peach does not sufficiently thin the fruit to get the best results, and hand-thinning must be resorted to. To grow large, fine peaches, too many must not be allowed on the tree. If it takes five peaches to weigh one pound, and by thinning you can make three of them weigh a pound, you have made money by investing in labor to do the thinning, for when you come to gather and pack your peaches you will have saved two-fifths in labor and have not lost anything in the number of pounds of peaches produced, and to the market value of your fruit three peaches that will weigh a pound will sell for 50 per cent more than were they to run five to the pound. It will not pay anyone to grow small, poor peaches. Choice peaches always have a market demand at paying prices, and the rule that there is never an over-production of the BEST of any commodity in the markets holds good in peaches, as it does in all commercial commodities.

PACKING.

It would be childish to say that choice, fine peaches would sell for top prices in our markets were they poorly packed. The peach-grower should see to it that his pack is an honest pack. Peaches should be uniform in size throughout the box, and anything over eighty to the box should never be sent to market. Remember the size of your peaches at packing time is a question of detail with the grower. If intelligently pruned, thinned and well cultivated on good soil, such peaches will run nearer forty-eight to the box than a higher number. Peaches running forty-eight to the box talk for themselves; the seller only has to pack them well and ship to market.

SMUDGES FOR FROSTS

It is well known that the danger from frosts is greatest in mild climates, in which "warm spells" are apt to occur in late winter or early spring. Many promising peach crops have been ruined through these frosts. Can a peach crop be saved from spring frosts by smudges? Frosts occur on clear nights. The earth's heat radiates rapidly on clear nights. With clouds or fog present, this radiation is greatly checked. Smudge fires that will produce blankets of smoke over a peach orchard on frosty nights prevents radiation, and unless an extreme freeze occurs a crop of peaches can be saved by smudging. In 1887 the spring was frosty. By building smudge fires on two frosty nights I saved the whole crop. That year I had the only peaches in the county. For smudging that year I used pitch to start the fires quickly, some dry oak to hold coals, and when well started, I smothered the fire with coarse barnyard manure to cause a dense smoke. To properly smudge against frost, the peach-grower should be prepared. His materials should be ready and placed around and through the orchard, ready for use during the danger period. On frosty nights the smudge fires should

not be started until about 3 o'clock A. M., as the thermometer will not indicate a dangerous temperature on a clear night until near morning; from then until sunrise the radiation is fast, and a blanket of smoke will preserve the crop. Frost occurs on still nights. Smudge fires cause air circulation, the smoke absorbs the moisture in the air. All of these physical conditions help to prevent frost injury.

I know some claim smudge fires heat the air, and by heat prevent injury from frost. I think this is a mistake, as when I smudged in 1887 I had a thermometer in the orchard where the smoke was dense, and one away where there was no smoke, and the reading of temperature taken at the same moment on both thermometers was the same.

The grower to smudge with success must be prepared. Fuel must be on hand, and plenty of it. At 3 o'clock A. M. if he finds the thermometer on a clear night near 32 degrees and going down, fires should be started at once and vigorously kept going until after the thermometer rises above 32 degrees. Many of the crude oils, petroleum or coal tar make dense smoke, and are good to use for smudging. Take sawdust and mix coal tar through it so it will press into cakes; these cakes give off a dense, heavy smoke when burning, and they burn slowly. Wet straw or refuse from the stable thrown over these coal-tar cakes help in creating a dense smudge.

The commercial peach-grower, if he would make a success of the peach, should include preparation for smudging as one of the details of his work, and every year be prepared to smudge. On very frosty years, with a small peach crop, prices always rule high. The energetic peach-grower who smudges his orchard during the danger of frost during the spring and saves his crop by smudging, is always well paid by increased demand and prices for his peaches, for the labor and expense of smudging.

A. H. CARSON,
Commissioner for Third District.

UPLAND ORCHARD PRACTICE IN EASTERN OREGON

By Hon. Judd Geer, *Commissioner of the Oregon State Board of Horticulture for the Fifth District.*

In submitting this article for the Tenth Biennial Report of the State Board of Horticulture, I will begin on the subject

VARIETIES TO PLANT.

The planting of an orchard seems to me a serious matter. I hesitate to offer any advice; however, there are some suggestions I am glad to make.

Other crops on the farm come and go with the seasons. If we make a mistake in one year we can try again next and perhaps correct our error. Not so with an orchard. Mistakes made in the beginning are difficult to overcome; in fact almost impossible to entirely correct. The rearing of a good orchard becomes in reality an important part of our life work, and one over which a world of sentiment hovers around, as we call to mind many poems and bits of verse that refer to it.

The varieties to plant is rather a hard subject to handle, for, owing to our great diversity of soil and climate in the Northwest, it is not safe to give more than general advice on the subject. Among the hundreds of well-known varieties of apples, there are few sections in which many good kinds do not succeed. It is usually safe to examine the growing orchards of the neighborhood, if there be any, to aid in determining those which best succeed. One variety may succeed in widely separated regions, while the sections between may be suited to an entirely different sort. This is well known in the case of the Yellow Newtown, which grows to perfection in some locations on this coast and in Virginia, while we are told that in no other known places does it attain the same perfection.

In selecting varieties of fruits for commercial purposes I would choose quality as the first and most important attribute.

Probably the highest authority obtainable is the revised catalogue of fruits prepared under the auspices of the American Pomological Society and the United States Department of Agriculture. In it you will find nearly every known variety described and graded. As the apple is our leading commercial fruit we will use that to illustrate.

The Spitzenburgh, for instance, is rated at 10, which is the limit as to excellence in quality; the Jonathan, 8-9; Yellow Newtown, 9-10; Yellow Bellflower, 8-9; Tomkins County King, 8-9; York and Rome Beauty, 7-8 each.

Never under any circumstances would I set out an apple that rates lower than the last two named.

Second in importance, is to select a well-known variety, one for which there is always a good demand in the best markets of the world. However excellent a new variety may be, it is almost impossible to obtain as good a price for it as might be gotten for standard varieties.

Third in importance is the number of varieties grown. Don't have too many varieties. More than one is well, as seasons vary, and by having three varieties one will usually have a good income every year; but, so far as the market is concerned, one could probably command a better price if every apple in his orchard was the same kind, providing it was some standard variety.

Prune Orchard of A. G. Conklin, Cove, Oregon

Select the best possible location available for the purpose. A mistake in this particular is not easily remedied. The drainage and soil should be good if good results are to be expected. Fruits will often color more highly if a sloping piece of land is chosen, especially if it slopes to the south or east.

SELECTING THE TREES.

Good stock should be chosen—the best that can be obtained. Not the largest always; in fact the younger trees are usually best if healthy, clean and vigorous. It is poor economy to secure low grade stock simply because first cost is less.

Too much attention can not be given to the preparation of the land at this time. Plow the land deep and see that it is thoroughly pulverized. You can do good work now, which if omitted, you will not be able to do at all after the trees are planted. A little labor now will produce better results than double the amount at a later period.

SETTING THE TREES.

Before setting the trees in the ground all mangled or bruised roots should be removed. Sod should never be allowed to form in a growing orchard. Keep running the cultivator at intervals of two weeks until the middle of August, when the wood should be allowed to ripen in preparation for the coming winter.

Pruning and training are important factors in the success of an orchard. The objects to be attained are a well-balanced top and spaces for the admission of air and sunlight to all parts of the tree, while still leaving foliage enough to protect the branches from the direct rays of the sun. This is an important matter where spraying is necessary. Much of the pruning may be done while the trees are young by rubbing off the buds and pinching off the tender branches with the thumb and finger.

The proper height at which to form the head is a matter of taste and convenience. My own choice is about three feet. With the improved implements now in use, thorough tillage can be as readily accomplished with a low top as a high one. No arbitrary rule, however, should be laid down as to the height of a fruit tree. This should depend upon the variety and the choice of the planter.

JUDD GEER,
Commissioner for Fifth District.

Rome Beauty Apple Trees, C. H. Conkey, La Grande, Oregon

GROWING THE EUROPEAN GRAPE IN OREGON

By Hon. A. H. Carson, *Commissioner of the State Board of Horticulture for the Fifth District.*

Whatever knowledge I may have was gained through more than twenty years of practical experience in grape-growing. I hope I may be able in this paper to point out details in the starting, growing and management of a vineyard that will aid the beginners so that they may avoid the errors and mistakes of which I have made so many.

The location of the vineyard is an important factor to assure success. The soil must be warm, of good depth and well drained. Cold, wet land is not congenial to the growth of the grape. Our foothill lands in the Rogue River Valley and along the Columbia River from The Dalles eastward, if the loam has depth not less than two feet, sloping to the southeast, south and southwest, with an elevation from twelve hundred to twenty-five hundred feet in the Rogue River Valley and under one thousand feet on the slopes of the Columbia and Snake Rivers, are ideal locations for vineyards, providing there is not too much broken rock in the soil to prevent thorough plowing and subsequent cultivation. To mature the grape it must be grown in an equable temperature with ample sunshine, and our southeast, south and southwest hillsides are locations that nearer furnish these conditions than would a northern slope or a level flat.

Do not plant the grape on a northern slope in this climate, as the variation in temperature during every twenty-four hours is much greater than on a southern slope, and, too, a southern slope will give on an average one hour more sunshine in twenty-four hours than on a northern slope. By planting your vineyard on a southern slope you avoid the blighting effect of the north wind on the bloom.

The quantity and quality of grapes grown on a northern exposure never equal those grown on a southern exposure. Assuming that the intended vineyard is grubbed and all stumps removed, thorough plowing of the ground to a depth of fourteen to sixteen inches should be had, with the surface well harrowed and pulverized.

To get this depth we use the turning plow and turn over the surface to a depth of eight inches and with a second team follow up each furrow as turned with a subsoil plow, breaking up the subsoil seven to eight inches deeper, letting it fall back into the furrow made by the turning plow.

Plowing and breaking up the subsoil to this depth insures good drainage to carry off surplus water in case of heavy rainfall, warms up the soil, pulverizes it, and enables the soil to stand drouth. With proper cultivation, that means much in growth of the new vineyard you seek to establish the first year.

Many old vineyards are planted too closely, too many vines to the acre; 6x8 and 8x8 feet is not distant enough. Any and all of the European varieties should not be planted nearer than 9x9 feet, 535 vines to the acre, and 10x10 feet would be better.

To get the best results the vine must have room to grow, with ample soil from which to draw its food, and you must have room to till and cultivate to make this plant food available to the young or old growing vine.

Preparatory to planting the young vines use a line about 300 feet long and lay out the end and side lines of the vineyard, so that one end and one side form a true right angle. Without a compass you can use a carpenter's

square to lay off a right angle. Peg these side and end lines the distance apart you wish your vines to stand in the vineyard. Use pegs half an inch in diameter, and in making your measurements from peg to peg use a pole the desired length between vines, always pegging carefully the distance your pole indicates. By using the line on each row and setting the pegs carefully with a well stretched line you can lay off any number of acres on level or rolling ground and the pegs will be in line in all directions. In planting the young vines do not remove the peg, but plant them on the south side of each peg, so that the top bud of the vine will be about one inch from the peg.

I would always use one-year-old rooted vines; cuttings are too much risk, as many of them fail to root in the vineyard, and if you use them you will always have many vacant places in the vineyard which you will have to replant the following year. Root your cuttings in warm, sandy loam in nursery.

A strong-rooted vine of one year's growth will put out canes from one to two feet in length. Cut back all of this growth to two or three buds. Shear off all lateral rootlets on the rooted cuttings close to the cutting, and of the rootlets at the lower part of the rooted vine, shorten them to two or three inches. This prepares the young vine to be planted in its new home. You can plant this young rooted vine any time in this climate from November 15 to May 1, providing you have the soil in condition and the weather is not freezing. What I mean by soil in condition is when it will work free and it is not too wet.

Last year I planted in vineyard 4,000 one-year rooted vines during April, and my loss was only one-half of 1 per cent. The most of this small loss was caused by rabbits and cutworms eating off the tender growth during the summer as fast as it grew.

After planting out, all you have to do this year is to cultivate and keep on cultivating whether there are weeds or not until August 15. Stir the surface soil once a week with a harrow or spring-tooth to conserve moisture. Your success in growing a vineyard will be in your willingness to pay the price—work. If you do not possess that capital—a willingness to work and bestow the necessary labor—don't plant a vineyard, as your success or your non-success will reflect your personality.

The first year let every bud that quickens and grows alone. Do not remove a leaf. It is one of the organs of the plant in conjunction with the roots that is necessary to establish the vine in the new home you have placed it in.

The first year the growth of the vine will be small and the beginner may at the end of the growing period be discouraged and fear that his soil and location are not adapted to the growth of the grape. Time will prove his fears are without reason. In February or March of the second year go over your young vineyard and cut back all growth of the first year, leaving only two or three buds. If two or more canes have grown, take off the weaker ones and leave the stronger one, but be sure to cut it back to two or three buds. Cultivate the vineyard as I suggested for the first year. By the middle of June you will find that many of your vines have grown canes four feet long or more, with strong, vigorous canes.

Pluck or cut off the weaker canes; drive a sharpened stake on the north side of the strong cane left and tie to it. After being driven the stake should be two feet high. It should be driven firmly. Tying the cane to the stake is particular work, as this cane forms the future stump to support the grape you hope to grow.

Two strong strings are required to tie a growing cane to the stake. The loop left around the growing cane must be left large enough so that the growing cane will not fill it so as to cut off and strangle it. The top string must be tied firmly near the top of the stake in a notch cut into the stake.

so that the swaying of the young cane by the wind will not work the top string down the stake, thereby pulling down the tender growth, which hardens in time and leaves you a crooked, deformed stump that pruning cannot remedy. Your only remedy in such cases is to cut back all the growth the spring following and start a new cane to form a new stump. There will be weak vines the second year which will not make strong enough growth to stake. Let them alone, and the third year cut them back to two or three buds and they will soon show a vigorous growth that will do to tie to a stake. Vineyards grown on the stump, as nearly all European varieties are grown, require staking for seven or eight years, until the stump is strong enough to bear its burden of luscious grapes. By using cedar stakes at the beginning you will avoid the necessity of restaking many vines.

Do not expect many grapes from your young vineyard until it is five years old. Commercially speaking, your profit will pay you 6 per cent on a valuation so large that I am too modest to tell you what the valuation is.

There are many choice varieties among the European grapes. The Muscat, Malaga and Flame Tokay are in my opinion the best three. Only the best should be grown for home use or the markets. All three are firm, late grapes, good keepers, great bearers, and quality superb, and if properly ripened, picked and packed will stand shipping across the continent and will sell in the Eastern markets at top prices.

There are many other table grapes, such as the Black Prince, Cornichon, Black Hamburg, Black Ferrera, Gros Maroc and Purple Damascus, that are fine.

I often hear the remark: "I believe I would like grape-growing, as grapes, like Topsy, just grow—you don't have to spray them." This is a mistake. I say to you that if you become a commercial grape-grower you will have to work. If you are to have success you will have to bestow the labor and care that men in apple, pear and peach-growing bestow to assure success. The grape has its fungi and its insect pests, and you will have to intelligently meet and overcome these diseases and pests or you will fail.

Of insect pests we have the grapevine aphis. This pest so far has not proved serious.

Then we have the green grapevine sphinx. The larvae of this insect some years are very plentiful, and if permitted would do serious damage to the growing vine. In this climate the female moth deposits from one to three eggs on the under side of the leaf about June 1. The egg is about one-twentieth of an inch in diameter, whitish in color and oval in form. In five or six days the egg hatches and the young larva soon begins on the young, tender foliage. His growth is rapid, and in a short time he becomes a python among leaf-eating worms. I have seen the grown larva that measured two and three-quarters inches in length and as large around as the little finger. Two or three of these grown worms will, if not discovered, soon strip every leaf from an old vine. Its natural enemies, the birds, destroy many of them, and owing to its large size you can readily detect him and when found knock him off the vine and with the hoe end him. The climbing cutworm is a serious pest on one and two-year-old vines. They are nocturnal in their habits, feeding at night, and were it not for our robins and bluebirds, who detect and destroy them in countless numbers, they would destroy any and all growing vegetation in our fields in early spring and summer months. Thanks to Governor Chamberlain's wisdom, when he interposed his veto to the Perkins bill, as to what extent the law can protect the fruit-growers' friends yet remains law.

The most dreaded insect pest is the grape phylloxera. It has not yet made its appearance in any of the vineyards of Oregon, but is in portions of the grape-growing district of California. When it does appear here, if it does, our only remedy is to graft the finer European grapes on resistant

roots. Of fungous diseases we have grape anthracnose, mildew, grape rot, rust and grape knot. All of these fungi readily yield to spraying with Bordeaux in the spring, just as the buds begin swelling, excepting the grape knot. This disease affects the old wood of all European grapes, and has existed in California since the first planting of the grape by the mission fathers. It does not affect the fruit in quality or size.

My oldest vineyard of 7,000 vines, which has been in bearing for over twenty years, has been affected with the grape knot from the beginning, and I have not lost ten grapevines from grape knot during that period.

Mildew you will find the most annoying fungus the grape-grower has to contend with. It affects the growing canes, leaves and fruit, and if it develops in any portion of the vineyard during the season you will lose all of the fruit on every vine it attacks. However, mildew is easily controlled. If you lose a crop of grapes from the mildew the fault is your own, as the remedy costs you but little.

If mildew once becomes established in the vineyard during the season, all vines so affected are past help for that season. Spraying the vines with Bordeaux, or flowers of sulphur shaken in each vine, will prevent mildew from developing. If flowers of sulphur is shaken in each vine when in bloom and again when the grapes are the size of BB shot it will prevent mildew, or if you will spray the vines with standard Bordeaux just as the buds begin swelling in the spring and again with modified Bordeaux when the grapes become the size of BB shot, you will prevent mildew. These remedies are cheap and effective, and if you become a grape-grower you run much risk if you fail to treat your vines annually.

The question of winter and summer pruning is hard to explain in a paper of this character so as to make it of practical value to a beginner. The beginner's best method to learn pruning is to go into a vineyard with a pruner of knowledge and have an object lesson. No two vines of the same variety are pruned exactly alike, as they all vary in vigor and must be pruned accordingly to get the best results. If my Jackson and Josephine County friends who are beginners in grape-growing will come to my vineyard in February and March I will be glad to give them object lessons in pruning the grape, so far as my knowledge goes on that subject.

Again, picking and packing the grape for market, as well as selling it, are phases of the grape-grower's work that would make this paper too lengthy to go into at this time. I hope to take this up at some future time.

The timid often say to me: "There are a good many people going to engage in grape-growing. Won't production soon be greater than demand?" My answer has always been "No." It must be remembered that the possibility to grow and mature such grapes as the Tokay, Muscat and grapes of their variety is limited to a very small portion of the United States. In Oregon these varieties can only be grown in the Rogue River Valley and about The Dalles, in Wasco County. The Willamette Valley cannot mature them. A limited portion of Idaho along the Snake River can grow them, and the State of California, a portion of Arizona and New Mexico can grow them by resorting to irrigation. Irrigated grapes do not have the shipping qualities that non-irrigated grapes have.

For the past seven years I have been shipping one to two thousand crates of these grapes to the Portland market. With increased shipments prices have advanced annually. My first year's shipment of Tokays sold for $1.10 per crate; California Tokays sold that year for $1.15 per crate. Oregon Tokays had to win their way against California Tokays. At that time—seven years ago—Portland fruit dealers would not acknowledge that Oregon Tokays had any merit in comparison with California Tokays. The Oregon Tokay has won out and are now regularly quoted as Oregon Tokays in the market reports of Portland. Last year every crate of Tokays I

shipped to Portland sold for $1.50 to $1.65 per crate, while California Tokays on the same date sold for $1.35 to $1.50 per crate.

You will ask, "Why do Oregon Tokays sell higher in Portland markets than California Tokays?" The question is best answered by my observations and talk with a retail fruit dealer on Morrison street in Portland last October. Passing down Morrison street, I noticed Tokays of my own growing together with California Tokays, and I stopped to look at them. The Oregon Tokays were labeled Oregon Tokays, 15 cents per pound, and California Tokays, 10 cents per pound. I asked the dealer why there was so much difference in the price of Oregon Tokays and California Tokays. "Why," he said, "you see the Oregon Tokays are highly colored. They look as fresh as if just picked from the vine. They will retain their fresh look for the next ten days and not one of them will decay, while the California Tokays are pale in color and are soft and beginning to decay. I have got to get them off my hands at once or else lose the purchase price. Yes, sir, we did not formerly think so, but now we know Oregon can raise a better Tokay than California."

I asked Mr. Pearson, senior member of the Pearson-Page Company, of Portland, last fall, how many crates of Tokays they could handle for me during a season of two months in the Portland market and keep prices up. His reply was: "We can handle two carloads a week, and will have no trouble to get you top prices." These are the conditions and demands of our local markets.

I have taken some pains in this paper to point out to you what the market demands will be for our choice table grapes if we will grow them, and to allay the fears of the timid who may desire to plant the grape yet hesitate on account of the specter of over-production, which is ever coming up in their minds to scare them and strangle any personal endeavor they may think of engaging in. Jackson and Josephine Counties have thousands of acres of choice hillside lands that today are as primitive as they were in the days of the early settlement of Oregon by the white race, that are adapted to growing the grape. As they now are they are non-productive. They are cheap and can be made into homes, by planting the grape, that will care for many families and will be a source of wealth to the owners as well as the State. If this paper induces anyone to take up grape-growing and improve these lands with success, which I know will follow, and if the hints and suggestions I have given are remembered, I shall feel amply repaid for the time spent in its preparation.

CULTURE OF THE AMERICAN GRAPE IN OREGON

By Hon. W. K. Newell, *President of the Oregon State Board of Horticulture.*

The first grapevine planted in Oregon, so far as known, was an Isabella brought across the plains by Henderson Lewelling in 1847 and set out by him at his place in Milwaukie in the spring of 1848. Hence the grape has been grown here for sixty years, but only in the last twenty years on a commercial scale. From a bulletin, "The Grape in Oregon," written by Professor E. R. Lake and published by the Oregon Experiment Station, I quote:

"While the world at large is most familiar with the history of the European grape (vitis vinifera), the history of the development of the American grape (vitis labrusca, and other species), which is at present receiving much attention by specialists, is even more interesting to the American horticulturist than that of its old world congener, for the reason that, except for parts of California, Oregon, Washington and Idaho, and as a special type for indoor culture, the European variety is not suitable to American climatic conditions.

"All the varieties of our American type of grapes have come originally from the wild grapes that grow abundantly throughout the Middle, Northern and Southern States, and they are generally divided into four distinct classes.

"First. The Northern Fox Grape class, vitis labrusca. It is the varieties of this class upon which the growers of this valley must chiefly rely. To this class belong the Isabella, Catawba, Concord, Worden, Moore's Early, Eaton, Niagara, Green Mountain, Brighton, Vergennes, Lady Washington, and a great many others.

"Second. The Sumner Grape class, vitis aestivalis. Only a few of this class are good for the table, but they are valuable for wine. One variety of this class, the Centennial, is a dull, yellowish-white grape; a good bearer; bunches of good size; berries somewhat below medium, but sweet and delicious. Though it ripens with the Concord, it can be kept until the new year.

"Third. The Riverside Grape class, vitis riparia. A few varieties of this class are good. The Empire State, a white grape that bears well; bunches, long; berry, medium, very sweet. The Elvira, another white grape; wonderfully productive; bunches, rather small; good for wine-making. Then there are many hybrids among the various classes, some of which are very fine, as the Salem, Agawam, Wilder and many others, but these are not so reliable and saleable as the Concord and the Niagara.

"Fourth. The Southern Fox Grape class, vitis vulpina. None of this class can be successfully grown in our climate.

"Those varieties that have been successfully grown here (the Willamette Valley) will be named here:

"The Concord. This is the grape for everybody; large, strong-shouldered bunches of big, black, sweet berries of the fine native flavor that all Americans like so well. It is very productive and always a sure bearer. Seven-year-old vines have borne more than thirty pounds each.

"The Worden. A black grape like the Concord: bunches large and heavy; berries larger than the Concord and rather better in quality; ripens about ten days before the Concord and is fully as productive.

"The Niagara. A white grape that bears well and regularly; bunches very large and heavy; berries sweet and of good flavor. This variety is gaining much in favor on the home market. It ripens about ten days before the Concord. It is the best of the white grapes.

"Moore's Early. A black grape; bunch medium; berry very large; quality as good as Concord, but vine not quite so productive. Very valuable here on account of its earliness. It ripens nearly three weeks before the Concord.

"Eaton. A very strong grower; bunch very large and heavy; berries very large, many an inch in diameter, black and of good quality. It sells well, but will not bear long shipment very well.

"Moore's Diamond. A very good white grape; ripens about two weeks before the Concord; bunch and berry large and of best quality; not so productive as the Niagara.

"Green Mountain. A white grape; rank grower; bears well; bunch long; berry medium, very sweet and delicious. It ripens here about the first of September.

"Vergennes. A red grape of good quality; bears well and is a good keeper; bunch and berry large.

"Brighton. A red grape of very best quality; bunch large; berry medium, very sweet and fine; keeps well. Ripens the same time as Concord.

"Delaware. Is so well known and succeeds so thoroughly under our conditions that I cannot pass it unnoticed. Bunch and berry small, light red, very sweet and of most delicious flavor. It is an abundant bearer.

"The above varieties have been found to be the best and most profitable for our home market, and they are sufficiently hardy and prolific to be all that the grower can desire of them."

The Concord properly stands at the head of the foregoing list and is the grape for the Western Oregon vineyardist to plant.

No longer ago than 1898 it was a customary practice for the fruit dealers of Portland to import every fall a few cars of New York grapes. Happily this practice is no longer necessary. A few men have grown grapes in Oregon for many years and with such success that the culture of this fruit is now becoming general. Puget Sound and British Columbia still import Eastern grapes, thus it is seen that there is a nearby market for us to supply. It is quite probable also, that a considerable trade can be developed in California for our Concord grapes, as this variety is not grown there, nor is there any other variety that will take its place.

In planting a vineyard give first attention to selecting a suitable location. Most any of the hill lands of Western Oregon that have a southern or southwestern exposure and that are sufficiently high to be free from late spring or early autumn frosts, will do. Elevations between two hundred and one thousand feet are best, though lower land near the Willamette River is just as good. A very necessary point to keep in mind when making a selection is that the site shall be such that the cold air can settle to the ravine or valley below; this is a great protection against frost, and, also, such land is usually naturally well drained. If the drainage is not naturally good then tile it; for a good, friable soil is a necessity in grape culture. Should one have no other suitable place, then plant a few vines against the south side of a building or tight board fence.

PREPARATION AND PLANTING.

For the grape nothing is better than new land or clover sod; plow deeply; harrow thoroughly; then dig holes for each vine, twenty-four to thirty inches in diameter and sixteen to twenty inches deep, putting the surface soil and sod back into the bottom of the hole. Vines should be planted in rows eight feet apart; and eight or ten feet apart in the row. This will require six hundred to eight hundred vines per acre.

A Field of Sugar Beets Near Arcadia, Oregon

The best time for planting is in April, and one-year-old vines are to be preferred. When planting, trim off all ragged or broken roots and cut back long ones one-half to two-thirds, and cut back the stem to two buds. Plant deeply, working fine surface soil carefully about the roots, then tread thoroughly with the fet until the hole is nearly full, and finish by spreading the earth from the bottom of the hole loosely over the top. When planted, set a strong four-foot stake an inch or so from the stem; always on the same side of the row so that they will not bother when cultivating.

Cultivate thoroughly from early spring until August 1 to 10. Cultivation after this latter date tends to prevent the proper ripening of the wood. The tools needed are a one-horse plow, a disc harrow, a cultivator and a hoe.

PRUNING AND TRAINING.

The pruning the first year is plain sailing, but after that it becomes more difficult, and the beginner should, if possible, visit some experienced grower and see how it is done, for it is very difficult to write directions sufficiently clear for a new hand to follow. As soon as the two buds left at the time of planting get long enough, tie the strongest one to the stake and rub off the other. Keep the new shoot tied carefully to the stake as it grows and rub off all laterals as fast as they appear. There are many ways of training the vine, but the fan shape on a wire trellis is my preference. If this method is adopted then the second spring the first season's growth must be cut back to twelve or fifteen inches from the ground, leaving the two top buds to grow, and rubbing off all other shoots and suckers as fast as they appear. Treat these two shoots just the same as the one of the first season.

The third spring build trellis. Use heavy cedar posts well braced at the ends and light posts every sixteen feet apart along the row. No. 12 galvanized wires, one twenty-four inches from the ground, the other forty-eight or fifty inches, should be stretched tight on the posts. Then cut back the two canes of the second season's growth to three or four buds each and tie to the lower wire, still keeping the main stem tied to the stake until strong enough to stand alone. Let two shoots grow from each branch of the vine, tying them to the wires as they grow out; when five or six feet long pinch off the ends. These should bear a few grapes, and will furnish the bearing wood for the next season. The fourth season four or five new shoots may be started for the fifth season's fruit, when the fourth season's canes are removed. This process is repeated each year, remembering, always, that the fruit is produced only on the new wood of the previous season; that is, on shoots which issue from canes of the previous year.

February is the best time for winter pruning; do not prune old wood after sap starts in spring. Summer pruning consists of rubbing off all suckers and superfluous buds and pinching back the shoots at the proper time. The shoots for next season's fruit should be pinched when they have attained a growth of five or six feet, and the bearing shoots (when the fruit has set) should have one leaf left beyond the farthest bunch of fruit.

MARKETING.

Allow grapes to become well ripened and sweet before gathering; a green grape is an abomination, and will discourage the buyer and lessen consumption. They should always be gathered when dry and should be allowed to stand twenty-four hours before packing to wilt and toughen slightly, so they will stand the handling better. Handle the berries just as little as possible in packing, but they must be packed firmly and closely to give full weight and avoid settling and injury in shipping. The pack-

ages used are the four-box crates containing twenty to twenty-two pounds and the four and eight-pound Climax baskets. The former are generally used for the white and red grapes, but the Concord type are almost universally put in the baskets. Market prices range from 50 cents to $1 per crate and 10 to 20 cents for the small baskets, and 20 to 45 cents for the large ones. To be profitable, beyond the needs of the local market, grapes must be grown in carload quantities. Express rates are too high to permit profitable shipments of small quantities. Our markets are now large enough to handle carloads at any time without difficulty, and it is the businesslike way to handle them. Communities of small growers must organize and ship together. Carloads of Concord grapes are shipped from New York and Pennsylvania as far west as Spokane each year, and occasionally they come into Portland and Seattle.

IRRIGATION OF ORCHARDS IN EASTERN OREGON

By Hon. Judd Geer, *Commissioner of the State Board of Horticulture for the Fifth District.*

Nothing accomplished by man in the line of agriculture seems more wonderful and complete than an ideal orchard, growing and maturing fruit of a high degree of excellence. No ambitious fruit-grower will be content in the future to spend year after year of his life in an attempt to grow perfect fruit without having the supply of moisture in a measure under his control. Irrigation is a question of vital importance to the Eastern Oregon fruit-grower, however favored may be his location.

For convenience I will divide orchards of our section into three classes. In the first class I will place all of those orchards grown on the reclaimed arid lands. These orchards could not exist for a season without the constant attention of man. They must have moisture applied in a scientific manner and the best of cultivation and care during the growing season. The results thus obtained are wonderful to behold.

In the second class I will place the many orchards here and there and everywhere, which without the aid of applied moisture produce quantities of fruit of little commercial value. In these orchards perhaps 50 per cent of the crop can be sold as second or third-grade fruit. The growers know they need an added supply of water and will make a reasonable effort to obtain it, and after a little judiciously used at the proper season will raise the quality of their fruit to first grade.

In the third class I would place all of those most favored ones that do not have to depend on irrigation to raise fruit. These, too, if wise, will keep in reserve a supply of water to apply in an off year when prices are sure to be high and returns correspondingly great. Every prolonged drought bears testimony of the great value of the reserved water to this class. At one time the advocates of non-irrigation attracted a great deal of attention. They proved that the tillage of surface soil prevented evaporation to such an extent that fruit trees and vines could make great growths and bear heavily with such moisture as was held in the soil from rainfall of the wet season. It was a great surprise that trees could do for several months without rain. While the non-irrigation theory is not practicable it served to prove to all how important it is that the moisture applied be combined with a high degree of cultivation to produce the best results. One fact has been proved beyond a doubt—a growing tree must have moisture to produce fruit of high market value. When other means fail, wise is the fruit-grower who has provided the means whereby he can supply it by means of irrigation.

Conditions of soil and climate vary to such an extent that no set rules can be formed to guide the fruit-grower. The plan which has given the best results in my orchard work I find is shallow plowing in the spring, followed by the use of some good cultivator which would thoroughly pulverize the soil. When the soil is in good condition it will seem pulverized at the surface and porous. Do not irrigate until you perceive that cultivation has failed to furnish the needed moisture. This you should be able to do before the tree suffers. Cultivation should be continued at intervals of two weeks during the growing season.

When the best work for moisture reception and retention has been done,

A Malheur County Apple Tree, August, 1907

PICKING SECOND CROP CLARK SEEDLING STRAWBERRIES
September 1, 1908, at home of J. S. Chanlers, La Grande, Oregon

and still the tree shows distress during a drought, or when the fruit is not of satisfactory size or quality, and the trees have been properly pruned and thinned, it is best to secure irrigation to aid the natural supply of moisture. Experienced growers soon learn to recognize the signs of distress in a tree suffering for moisture: Small leaves, short and thin wood growth. Sometimes trees which make a good wood growth will fail to bear fruit from a failure of moisture when the fruit buds should develop. A prevention of this is of course irrigation applied in advance of the need.

A supply of water is invaluable in many localities during the first season after planting an orchard. Trees set in the early spring will start and make a fine growth for a few months, but as the season advances the leaves will wither and fall off. The roots cannot penetrate during the first season to a depth that will insure the life of the tree. A little attention at this time will insure the welfare of the tree. The first summer of a young orchard is a trying one. Too much care and attention cannot be given it. There is always a disposition at first to use too much water; and to the unwise use of water are due the evils that have been charged against irrigation. The claim that irrigated fruit is lacking in flavor was based on the fact that some growers chose to produce monstrous, insipid fruit by excessive irrigation. Many concluded that all irrigated fruit was necessarily poor and failed to supply the needed water to trees, and gathered only small, unmarketable fruit because the natural rainfall failed to supply the needed moisture to develop first-grade fruit. It is now conceded that the highest quality, including flavor as well as size, can be secured only by adequate moisture; it matters not in what manner it reaches the roots of the tree.

JUDD GEER,
Commissioner for Fifth District.

THE WALNUT IN OREGON

By H. M. Williamson, *Secretary of the Oregon State Board of Horticulture.*

The planting of walnut trees was commenced in a small way in Oregon many years ago. Evidence of this was found at the apple and walnut show held at McMinnville in 1907, at which walnuts were exhibited which came from trees of the fourth generation grown from seed in this State. Many of the earlier plantings were of nuts bought at grocery stores. A few immigrants from Germany sent to the Fatherland for walnuts for planting. In those cases in which the nuts planted were grown in Germany or France the trees have usually proved fruitful; when the nuts came from Chile, or were grown in California from trees of what are commonly known as the Santa Barbara type, the trees have borne only in rare instances. As the greater part of the earlier plantings were of the Chilean and Santa Barbara nuts, the belief long ago became prevalent in Oregon that the walnut would not bear enough nuts in this State to make its culture here profitable. Some twenty-five or thirty years ago the late Mr. Felix Gillet of Nevada City, California, called attention to the fact that the varieties of walnuts raised in France start into growth very much later in the spring than the Chilean varieties, and thus escape the frosts which make the Chilean varieties unfruitful in Northern California and Oregon. Colonel Henry E. Dosch of this State became interested and was soon convinced that the French varieties of walnuts would find most congenial conditions in Oregon. By addresses at horticultural meetings and articles written for the press he awakened interest here. About 1888 the planting of Franquette, Mayette and other varieties of French walnuts was commenced in an experimental way in Oregon. It is true that a few trees of the Proeparturiens and other French varieties had been planted prior to that time, but it was not until the Mayette and Franquette trees planted near Portland in Oregon and Washington began to bear that much interest was shown. The very satisfactory results obtained from young bearing trees in the vicinity of Vancouver, Washington, prompted the planting of the first large grove in Oregon, that of Thomas Prince at Dundee. Of one hundred acres now in walnuts on the farm of Mr. Prince, fifty acres were planted from ten to twelve years ago, or from 1896 to 1898. The walnuts grown by Mr. Prince and others in Oregon have awakened great interest in walnut culture in this State, and the danger of over-production has been suggested. Existing conditions, however, show little reason for this fear. More than ten years ago it was predicted that within ten years California would be producing more walnuts than would be consumed in the United States. This prediction has not been verified. The walnut crop of California for 1907 was but about twenty per cent larger than that of 1896, and the industry does not appear to be growing perceptibly in that state at the present time if we may judge from the annual estimates of the quantity of walnuts grown there. In that portion of the state in which the greater portion of the walnut crop is produced the price of land is from three to five times as much as land adapted to walnut culture can be bought for in Oregon. This high price of land has naturally checked the planting of new groves in that portion of the state. While there has been but slight increase in the production of walnuts in California in the past six or eight years the demand for walnuts in the United States has grown at an unprecedented rate. Of the whole weight of walnuts imported for use

View of Twelve-Year-Old Walnut Grove of Thomas Prince, Dundee, Oregon, 1908

in this country about four-fifths are whole nuts and the remainder shelled meats. Making due allowance for the shells the importations have been as follows for the years named below:

Year.	Pounds.
1902	14,149,316
1903	15,004,378
1904	26,615,898
1905	24,708,156
1906	28,423,306
1907	31,453,577

The production of walnuts in California amounts to about 15,000,000 pounds annually. The consumption of walnuts in the United States is increasing at the rate of about 4,000,000 pounds per year As the average crop from groves in full bearing does not exceed 1,000 pounds per year, it will require the addition of 30,000 acres of full-bearing groves to supply the amount we now import and the addition of at least 4,000 acres annually to keep up with the growth of consumption.

OUR FAVORABLE CONDITIONS.

We are informed by horticultural authorities that the walnut of commerce, commonly called the English walnut, originated in Persia. Notwithstanding this it does not do its best as a nut-producer in places where the summer heat is great. It was long ago learned in California that the walnut gave best returns near the ocean where summer temperature is modified by cool ocean breezes. It is also well known that the walnut has never been grown profitably in the Southern States. Our mild summers and other climatic conditions in Western Oregon appear to be peculiarly favorable to the growth of walnuts and the production of nuts of the highest quality. Trees which are now more than forty years old are making vigorous growth and promise to increase in size for many years to come.

WHAT SHOULD BE EXPECTED.

No person who has studied any agricultural or horticultural industry can have failed to observe the mischief done by the general acceptance of too sanguine anticipations of profit. Whenever persons are entering on the production of an article with the belief that they will obtain therefrom profits larger than are reasonably to be expected from any safe business, the kind of men who would be most likely to succeed in the profitable production of that article turn their attention to the production of some other article. This naturally results in many failures and few successes on the part of those who do engage in the industry; an inferior average product, and general disgust with the industry.

The walnut tree on the Pacific Coast often begins to bear when three or four years old, but it can not reasonably be expected that a walnut grove will pay before it is eight years old. The United States census of 1900 showed that California had 701,426 walnut trees which yielded in the previous year 10,619,975 pounds of nuts. The crop of the state for 1907 was about 14,000,000 pounds of nuts, or about twenty pounds for each tree standing in the state in 1900, the greater part of which were already bearing in 1900. As the majority of the walnut groves in California have about twenty-five trees to the acre, the crop of the past year would average for all groves, good, bad and indifferent, about 500 pounds per acre. Mr Elwood Cooper, one of California's most experienced walnut growers, as well as most prominent horticulturists, has stated that an average yield of 1,000 pounds per acre is as much as can be expected when walnuts are grown on a commercial scale. Much larger yields than this have been reported from some groves, and the yields of isolated trees are sometimes

Mayette Walnut Tree on Geo. P. Dekum's Deepdene Farm, Near Aurora, Oregon. Nut planted in 1906; tree set in 1907; photographed in August, 1908.

Old "English" Walnut Tree on Deepdene Farm of Geo. P. Dekum, Near Aurora, Oregon

very large. Oregon has not yet had sufficient experience to determine what may be reasonably expected in this state and it is the safe plan not to count on more than the amount stated by Mr. Cooper. When a man has a walnut grove which can be depended upon to annually produce a crop worth a hundred dollars per acre it will be found no easy matter to persuade him to sell that grove for five hundred dollars per acre. The groves which have come into bearing in Oregon have so far borne every year. The cost of taking care of the grove is not great after the tree has established its top. After that time there will be little pruning to do and there will be little if any spraying. The work of gathering, cleaning, drying and packing the nuts for market is less expensive than that of harvesting, curing and packing prunes, pound for pound of finished product.

SITE AND SOIL.

The most important thing to consider in the selection of a site for a walnut grove is the nature and depth of the soil. To obtain a satisfactory growth of trees and paying returns within a reasonably short period of time the soil must be both deep and rich. The soil and subsoil should be of such a nature that a hole or well can readily be dug to a depth of at least ten feet with a common spade, and without running into actual sand or gravel. Below that depth it is desirable to have either sand or gravel to give the land good drainage. Thorough drainage is essential and water should not stand for many days at one time within ten feet of the surface. Frosty swales should not be chosen. While the walnuts of the French varieties are rarely caught by frost in Oregon, yet a location which is not subject to late frosts should be selected.

VARIETIES ADAPTED TO OREGON.

The varieties of walnuts grown in France are those which are adapted to Oregon. Many varieties have been introduced from France, but of these only a few have yet been sufficiently tested to justify their recommendation for planting on a commercial scale in Oregon. The two great standard market varieties are the Franquette and the Mayette. These do not differ greatly in size and general appearance. Both are market nuts of the highest quality. The Mayette is the older variety and the nuts of this variety have long been known to the markets of the world as "Grenoble walnuts" and command the highest prices paid. The Franquette nuts are also sold as Grenoble walnuts. They are equal in quality to the Mayette; are a little larger; are better filled and the trees appear to yield rather better. In proportion of meat to shell the Franquette leads all other standard varieties. For home use the Proeparturiens is worthy of consideration. It bears early and heavily and the quality of the nuts is extraordinarily high. The only objection to the variety is that the nuts are not large enough to command the best prices in the market. In France the Chaberte is grown quite extensively in mountainous districts where the climate is too severe for other varieties. The nuts are smaller than those of the Mayette and Franquette and do not command as good prices, although much used by confectioners.

Of the newer varieties, one of the most promising is the Meylan. It is up to the standard in quality and is unusually attractive in appearance. The Lanfray is another nut of most attractive appearance and is very heavy in proportion to its size, as it is so well filled with meat. The Parisienne was formerly thought the most promising of the comparatively new varieties, but it is now believed that it is a light bearer.

Those who enjoy growing big things will be attracted to the Gant or Bijou; the Mammoth Proeparturiens and Ford's Mammoth. These are varieties which bear nuts of extraordinary size and which for that reason

attract much attention, but it is thought that it will not be profitable to raise them on an extensive scale. The meats are not near as large in proportion to the size of the nut as is the case with the standard varieties. The Bijou is probably the best of these for Oregon conditions, although the matter has not yet been sufficiently determined by experience to justify a positive opinion. The Mammoth Ford is doing fairly well in one or two places in Oregon, but it originated in California and is believed by many to be not a safe variety for Oregon.

In time new varieties will undoubtedly be originated in this State which will prove better than any we now have, especially for growing in Oregon. The great number of seedling trees which have been and will be planted in this State will give unusual opportunities for the origination of new varieties of value. There are now in the grove of Mr. Prince at Dundee several trees which appear to be superior in merit to the parent varieties.

Planters should be sure the trees they plant are of the French varieties. They are adapted to this climate for the reason that they start into growth late in the spring and escape danger of injury from late frosts, whereas the trees of the Chilean type grown in Southern California start into growth very early in the spring, and for that reason are rarely fruitful in Oregon. The trees of the Chilean type are in all respects more tender than those of the French varieties.

Owing to the fact that the process of grafting walnut trees of nursery size is a difficult matter, with a great percentage of failures, the supply of grafted trees is always very small and the prices are necessarily high. It is necessary therefore to plant for the most part seedling trees. It is well known to horticulturists that there are varieties of peaches which can be propagated by raising seedlings and still produce fruit quite like that of the parent tree, while other varieties, if propagated in this way, would result in fruit of widely different quality, size and appearance from that of the parent tree. The same appears to be true of walnuts. The planting of large and excellent nuts has sometimes resulted in trees bearing nuts of most inferior size and quality. The standard French varieties appear to fairly well reproduce themselves through seedlings. There is much variance, it is true, yet on an average the nuts on the seedling trees will average as large and as good as those grown on the parent tree. There is usually enough resemblance also in appearance to enable one to tell which variety the seedling nuts belong to. Both in France and in this country it is the practice of reputable nurserymen to plant only nuts which have been grown on grafted trees. This rule has evidently been based on long experience in France, and planters will do well to insist on having trees of this kind. The idea naturally suggests itself, also, that the chances for variation will be least if the nuts are not only grown on grafted trees but also on trees so situated that there is no opportunity for cross-pollination.

While the nuts grown in Oregon and Washington on seedling trees of the character above described (called second-generation) and of the standard French varieties command the highest prices paid for walnuts in the markets of this country, it will undoubtedly be found the most profitable in the long run to top-graft the trees in the grove when they are three or four years old. This will insure the bearing habit of the named variety, and a uniformity in the appearance of the product which can not fail to add to its market value.

NUMBER OF TREES PER ACRE.

The walnut tree becomes in time very large, and it has been found everywhere that it does best when the trees are not too close together. If one is planting with the intention of top-grafting when the trees are three or four years old, it may be well to set the trees four rods apart, which will

give ten trees to the acre. In this case it will be necessary to raise something else on the land to utilize the space between the trees for a number of years. Cultivated farm crops with occasional rotations in clover or vetches can be grown, or small fruits or filberts, according to circumstances and the taste of the planter. In some places prunes may be used as "fillers," or other fruit trees which do not rapidly develop into large it will probably be most satisfactory to set the trees about forty feet apart trees.

If it is intended to rely upon seedling trees for the nuts to be produced and in thinning take out the trees which prove inferior either as trees or in quality or yield of product.

The walnut enjoys rich soil and thorough cultivation. Unless the land is new and rich in vegetable matter and available nitrogen it will pay to grow the common vetch (vicia sativa) as a winter cover-crop to be worked into the soil in the spring.

In order to obtain a shapely tree with its head sufficiently high to keep the lower branches off the ground it is necessary to use heavy stakes about the length of a fence rail. If not staked while young the trees are almost certain to lean badly and may even break off near the ground before the trunk has become strong enough to support the top.

HARVESTING AND CURING THE CROP.

The walnut ripens in Oregon in October. When the pods have commenced to break open and allow the nuts to drop it is time to start the work of harvesting the crop. Some growers use long poles to whip the branches and shake out the mature nuts. Mr. Thomas Prince of Dundee, Oregon, prefers to use a padded mallet. A man climbs a tree and strikes the limbs with the mallet. The jar causes the nuts which are mature to drop out of their pods. It is necessary to go through the grove several times, as the nuts on a tree do not all mature at the same time. If the weather is cool the nuts will lie on the ground several days without injury in this State, and are not damaged by rains, which are much dreaded by growers in California.

As soon as the nuts are gathered they should be well washed in clean water. This can readily be done in any properly equipped prune-drying house by the use of the dipping apparatus. A cylinder made of strong and coarse-meshed wire cloth arranged so that it can be rotated in a vat of water will be found convenient for this work, and the same cylinder can be used (without the water) for the final polishing of the nuts. When washed the nuts are spread upon trays such as are used for drying fruit and placed in the drying chamber. The experience of Mr. Prince shows that a steady circulation of air at low heat is best. He prefers not to have the air warmer than 85 degrees Fahrenheit. He would under no circumstances allow the heat to rise above 110 degrees in the drying chamber. If a higher temperature is used it tends to make the nuts oily and to deprive them of the fine delicacy of flavor which is so greatly admired by connoisseurs and is characteristic of Oregon-grown walnuts. A little experience will enable the operator to determine when the nuts are sufficiently dried. After the nuts come out of the drying chamber they should be placed in bins and kept there about two weeks. While in the bin they should be examined frequently, and if they show moisture, or mould appears, they should be dried again. When there is no doubt of the nuts being sufficiently dry they can be sorted and packed for market. It is not the practice in Oregon and Washington to bleach the nuts in any way, but to place them on the market with their natural color. As bleaching with sulphur is very objectionable and other methods are rather expensive and add nothing to the value of the fruit, it will probably be well to continue

Twelve-Year-Old Walnut Tree in Grove of Thomas Prince,
Dundee, Oregon, 1908

marketing the Oregon product without bleaching and to persistently call attention to the fact that they are not bleached on every package in which the nuts are placed for marketing. The process of polishing the nuts is not expensive and may probably be adopted to good advantage. The work is done by partially filling a cylinder with nuts and rotating the cylinder. The nuts are polished by the rubbing of one nut against another in the cylinder.

When ready to pack the nuts, the method followed by Mr. Prince is to spread the nuts on sorting tables. All worthless nuts, if any, are thrown into a waste box. The nuts which are discolored or ill-shapen go into another box as seconds, and all perfect nuts are placed in the third box. The seconds are put into bags and are for the most part sold to confectioners, although their comparative cheapness creates a demand for them from other users of walnuts. It has not hitherto been the practice of Mr. Prince to grade the first-class nuts as to size, but this practice will undoubtedly come in. Mr. Prince markets his first-class nuts (and they constitute the bulk of his crop) in one-pound cartons. In packing in cartons every packer is provided with scales and an exact pound of nuts (not including the weight of the carton) is placed in each package. He follows the same rule in filling bags and the buyer does not pay for the weight of the bag.

The nuts grown and sold by Mr. Prince command the highest prices obtained for any walnuts offered for sale to consumers in the United States. It is hoped that every grower of walnuts in this State will realize the importance of using great care in curing and packing his product for market so that the high reputation already obtained for our nuts in those places in which they have been introduced may be maintained as the growing volume of product enables us to send them to market in all parts of the United States.

GEN. GOODBROD'S ORCHARD "BY THE LAKE," UNION, OREGON

HORTICULTURAL LAWS

Act passed by the Legislature, February, 1895.

An act to amend an act entitled "An act to create a State Board of Horticulture and appropriate money therefor," approved February 25, 1889, and an act amendatory thereof, entitled "An act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889," approved February 21, 1891, and to protect the horticultural industry in Oregon.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. There is hereby created a Board of Horticulture to consist of six members, who shall be appointed by a board, consisting of the Governor, Secretary of State, and State Treasurer. One member of the said Board of Horticulture shall represent the State at large, and one member shall be appointed to represent each of the five districts as hereby created, to-wit (provided that the commissioner-at-large shall not receive any pay for his services): (1) The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) the Second District, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) the Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry, and Lake; (4) the Fourth District, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) the Fifth District, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant.

Section 2. The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith. They shall hold office for the term of four years, and until their successors are appointed and have qualified; but the members of said Board now in office shall hold office till the expiration of the term for which they were appointed.

Section 3. Said Board shall employ from without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $75 per month, to be paid in the same manner as other State officers. Said Board shall also elect from their own number a treasurer, who shall give a bond to the Governor of the State of Oregon in the sum of $10,000, conditioned upon the faithful discharge of his duties. Before entering upon the discharge of his duties, each member of the Board shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully, and impartially discharge the duties of his office, which said oaths shall be filed with the secretary. The secretary shall make and subscribe a like oath, which shall be filed with the treasurer of the Board.

Section 4. The Board may receive, manage, use, and hold donations and bequests of money and property for promoting the objects of its formation. It shall meet on the second Mondays of April and October of each year, and as much oftener as it may deem expedient for consultation and for the adoption of those measures which will best promote the horticultural in-

dustries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the districts named in section 1 of this act, for the purpose of encouraging and improving practical horticulture, and of imparting instruction in the best methods of treating the diseases of fruit and fruit trees, cleansing orchards, and exterminating insect pests.

Section 5. The office of the Board shall be located in such place as a majority thereof may determine. It shall be kept open to the public, subject to the rules of the Board, every day excepting Sundays and legal holidays, and shall be in charge of the secretary during the absence of the Board.

Section 6. For the purpose of preventing the introduction into the State or spread of contagious diseases, insects, pests, or fungous growths among fruit or fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests, and diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, fruit boxes and packages, and other material or transportable articles dangerous to orchards, fruit or fruit trees, said Board may make regulations for the quarantining, inspection, and disinfection thereof, which said regulations shall be circulated by the Board in printed form among the fruit growers and fruit dealers of the State; shall be published at least four successive times in some daily or weekly paper in each county in the State before the same shall be in force therein, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the county court house. Such regulations, when so promulgated, shall be held to import notice of their contents to all persons within the State, and shall be binding upon all persons therein. A willful violation of any quarantine or other regulation of said Board, necessary to prevent the introduction into the State, or the shipment, sale or distribution of any article so infected as to be dangerous to the fruit-growing interest of the State, or the spread of dangerous diseases among fruit trees or orchards, shall be deemed a misdemeanor, and on conviction thereof shall be punished by a fine of not less than $5 nor more than $100 for each offense, or by fine and imprisonment, not less than five nor more than thirty days.

Section 7. It shall be the duty of the several members of the Board, and the secretary under their direction, to visit their respective districts and to see that all regulations of the Board and all provisions of law to prevent the introduction or spread of fruit pests and diseases of trees or plants injurious to the horticultural interests of the State are enforced. Any member of the Board, or secretary thereof, shall forthwith, upon the complaint of interested parties, inspect orchards, nurseries and other places suspected of being infested with fruit pests or infected with contagious diseases injurious to the trees, plants or fruits. If, upon report of any member or the secretary, the Board shall be of the opinion that any locality, district, orchard or place is infested with fruit pests, or infected with contagious diseases, or injurious to trees, plants, or fruits, and liable to spread to other orchards or localities to their damage or injury so as to be a public danger, said Board shall, by an order entered upon its minutes, declare such a place to be under quarantine, and shall give notice thereof by posting a notice in writing in a conspicuous place upon the premises, specifying with convenient certainty what place or premises are under quarantine regulations, and by delivering a copy of such notice to the owner or person in charge of the premises, if he may be found thereon; and such place shall thereafter be subject to quarantine regulations of the Board, and violation thereof shall be punishable as hereinbefore provided. As soon as, in the opinion of any member of the Board or the secretary thereof, the danger from such quarantine locality shall have ceased, he may suspend the said quarantine and shall immediately report

the fact to the Board, who may confirm such action or may re-establish the said quarantine, in which case it shall not be again suspended but by action of the Board.

Section 8. The Board, and, in case of necessity during the recess of the Board, the member residing in a quarantined district, or the secretary, may appoint such quarantine guardian as may be needed to carry out the provisions of this act, whose duty it shall be to see that the regulations of the Board and the instructions of the secretary are enforced and carried out. They shall also report to the Board all infractions or violations of said regulations or the law in regard to quarantining, disinfection, and destruction of pests. The salary of quarantine guardians shall be fixed by the Board at not to exceed $2 per day, and shall be paid by the owners of orchards or other places under quarantine, and they may maintain an action therefor before any justice of the peace in any district in which any quarantined locality is wholly or in part located; but in no case shall they have any claim upon the State for such services.

Section 9. The powers conferred in the two preceding sections of this act shall be exercised only in great and imminent danger to the fruit interests of the State, and with the utmost caution and regard for the rights of individuals affected, consistent with the safety and welfare of the fruit interests of the whole State.

Section 10. It shall be the duty of the several members of the Board, and of the secretary, under their direction, whenever they shall deem it necessary, to cause an inspection to be made of any orchard, nurseries, trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place within their districts, and if found infested with any pests, diseases or fungous growths injurious to fruits, plants, vegetables, trees or vines, or with their eggs or larvae, liable to spread to other places or localities, or such nature as to be a public danger, they shall notify the owner or owners, or person in charge of or in possession of such articles, things or places, that the same are so infested, and shall require said persons to eradicate or destroy said insects or pests, or their eggs or larvae, or to treat such contagious diseases within a certain time, to be specified in said notice. Said notices may be served upon the person or persons, or any of them, owning, having charge, or having possession of such infested place, article, or thing, by any member of the Board, or by the secretary thereof, or by any person deputized by the said Board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruits or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or on the property of any non-resident or any property not in the possession of any person, and the owner or owners of which can not be found by the resident member of the Board or the secretary, after diligent search within the district, it shall be the duty of the Board, or the member thereof in whose district said nuisance shall exist, or the secretary under his or their direction, to cause such nuisance to be at once abated, by eradicating or destroying said insects or pests, or their eggs or larvae, or by treating or disinfecting the infested or diseased articles. The expense thereof shall be a county charge, and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid

shall be and become a lien upon the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises; which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situated, by the district attorney, in the name and for the benefit of the county making such payments. The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court, and the proceeds applied in like manner. The Board is hereby invested with the power to cause such nuisances to be abated in a summary manner.

Section 11. It shall be the duty of the secretary to attend all meetings of the Board, and to preserve records of the proceedings, correspondence and actions of the Board, to collect books, pamphlets, periodicals, and other documents, containing valuable information relating to horticulture, and to preserve the same; to collect statistics and general information, showing the actual condition and progress of horticulture in this State and elsewhere to correspond with agricultural and horticultural societies, colleges and schools of agriculture and horticulture, and such other persons and bodies as may be directed by the Board, and prepare, as required by the Board, reports for publication.

Section 12. The Board shall, biennially, in the month of January, report to the Legislative Assembly a statement of its doings, with a copy of the treasurer's report for the two years preceding the session thereof. The members shall receive as compensation their actual expenses while engaged upon the work of the Board or the enforcement of the provisions of this act, and shall be allowed $3 a day for the time actually employed.

Section 13. The treasurer shall receive all moneys belonging to the Board and pay out the same only for bills approved by it, and shall render annually to the Board a statement in detail of all receipts and disbursements.

Section 14. There is hereby appropriated for the uses of the State Board of Horticulture, as set forth in this act, the sum of $4,500 for the year beginning January 1, 1895, and the sum of $4,500 for the year beginning January 1, 1896, out of any moneys in the state treasury not otherwise appropriated, and the Secretary of State shall draw his warrant in favor of the treasurer of the Board for said sum upon the State Treasurer.

Section 15. That the fruit and horticultural interests of this State, being in urgent need of the protection afforded by this act, an emergency exists, and this act shall take effect from and after its approval by the Governor.

Approved February 23, 1895.

An act to amend an act entitled "An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889, and an act amendatory thereof, entitled, 'An act to amend an act entitled an act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889, approved February 21, 1891, and to protect the horticultural industry in Oregon, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor,' approved February 25, 1889; approved February 21, 1891, and to protect the horticultural industry in Oregon," approved February 23, 1895.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. Section 1 of an act entitled "An act to amend an act entitled 'An act to create a State Board of Horticulture. and appropriate money therefor,' approved February 25, 1889, and an act amendatory thereof, entitled an act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' approved February 21, 1891, and to protect the horticultnral industry in Oregon," be and the same is hereby amended so as to read as follows:

Section 1. There is hereby created a Board of Horticulture, to consist of six members, who shall be appointed by a board, consisting of the Governor, Secretary of State, and State Treasurer. One member of said Board of Horticulture shall represent the State at large, and shall be the president and executive officer of the Board, and one member shall be appointed to represent each of the five districts, as hereby created, to-wit: (1) The First District, which shall comprise the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop, and Tillamook; (2) the Second District, which shall comprise the counties of Marion, Polk, Benton, Lincoln, Linn, and Lane; (3) the Third District, which shall comprise the counties of Douglas, Jackson, Klamath, Josephine, Coos, Curry and Lake; (4) the Fourth District, which shall comprise the counties of Wasco, Sherman, Morrow, Gilliam, and Crook; (5) the Fifth District, which shall comprise the counties of Umatilla, Union, Wallowa, Baker, Malheur, Harney, and Grant.

Section 2. Section 2 of an act entitled "An act to amend an act entitled 'An act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' and an act amendatory thereof, entitled 'An act to amend an act entitled an act to create a State Board of Horticulture and appropriate money therefor, approved February 25, 1889,' approved February 21, 1891, and to protect the horticultural industry in Oregon," be and the same is hereby amended so as to read as follows:

Section 2. The members shall reside in the districts for which they are respectively appointed. They shall be selected with reference to their knowledge of and practical experience in horticulture and the industries connected therewith, and shall be engaged in practical horticultnre during their incumbency of the office of commissioner. They shall hold office for the term of four years, and until their successors are appointed and have qualified, unless removed by the appointing board for failure to perform their duties. It shall be the duty of the president to visit at least once a year every district, and examine the orchards, nurseries, and work of the district commissioners, and ascertain whether or not the law and regulations of the Board are being properly executed. He must personally inspect most of the orchards during the fruit-growing season, see that the regnlations of the Board regarding spraying are being faithfully executed wherever insects, pests or diseases injurious to tree or fruit are to be found. He must visit the principal fruit-shipping points during the shipping season, inspect the fruit shipped, and prevent the shipment of insect and pest-infested fruit. He shall give notice through the public press one week in advance of his visit to each county, giving the time and place of his visit, where he shall receive complaints of fruit-growers, and distribute to them printed and oral instructions regarding destruction of pests, and other information, including proper methods of handling, packing and shipping fruits. It shall also be his duty to visit, when possible, if requested by an association or a number of fruit-growers, the meetings of such associations of fruit-growers, and aid them in the organization of proper associations beneficial to the growing and marketing of fruits. The president shall preside at all the meetings of the Board, and may call special meet-

ings whenever an emergency may require it. He shall make an annual report to the appointing board of the general condition of the fruit interests in the State and success of the commissioners in the work of exterminating pests and executing the law.

Section 15. Inasmuch as the provisions of this act are of immediate importance to the horticultural interests of this State, this law shall take effect from and after its approval by the Governor.

Approved February 17, 1899.

An act to protect the fruit and hop industry of Oregon.

Be it enacted by the Legislative Assembly of the State of Oregon:

Section 1. It shall hereafter be unlawful for any person, firm, or corporation, owning or operating any nursery, fruit orchard of any kind, hop yards, flower gardens, or ornamental trees, to throw any cuttings or prunings from any fruit trees, nursery stock, ornamental trees, or hop vines into any public road, highway, lane, field, or other inclosure, or into any water course of any kind; but shall destroy such cuttings or prunings with fire within thirty days from the time such cuttings or prunings are made.

Section 2. It shall hereafter be the duty of any person, firm, or corporation owning or operating any such nursery, fruit orchard, hop yard, flower garden, or ornamental trees, and knowing such to be infected with any kind of insects, pests, or disease, to immediately spray or destroy the same in such manner as the fruit commissioner for his district may direct.

Section 3. It shall be unlawful for any person, firm, or corporation doing business in the State of Oregon to sell paris green, arsenic, london purple, sulphur, or any spray material or compound for spraying purposes in quantities exceeding one pound without providing with each package sold a certificate, duly signed by the seller thereof, guaranteeing the quality and per cent of purity of said materials.

Section 4. Any person, firm, or corporation selling any of the above materials which do not conform with the certificate furnished therewith, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be subject to a fine of not less than twenty-five ($25) dollars nor more than one hundred ($100) dollars.

Section 5. It shall be unlawful for any person, firm or corporation to import or sell any infected or diseased fruit of any kind in the State of Oregon.

Section 6. Every person who packs or prepares for shipment to any point without the State, or who delivers or causes to be delivered to any express agent, or railroad agent, or other person, or to any transportation company or corporation for shipment to any point without the State, any fruit or fruits, either fresh, cured or dried, that is infected with insects, pests or diseases injurious to trees, shrubs, plants, fruits or vegetables, is guilty of a misdemeanor.

Section 7. Any person, firm or corporation violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine of not less than twenty-five ($25) dollars nor more than one hundred ($100) dollars.

Section 8. It shall be the duty of the commissioner of the State Board of Horticulture of the district in which a violation of this act occurs to present the evidence of the case to the district attorney, whose duty it shall be to prosecute any person guilty of a violation of this act, which prosecution may be brought in any of the justice courts of this State.

Section 9. Inasmuch as the horticultural interests of this State demand immediate attention, this act shall be in full force and effect from and after its approval by the Governor.

Approved by the Governor.

An act to provide for the appointment of county fruit inspectors, and to amend sections 4178 and 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton.

Be it enacted by the People of the State of Oregon:

Section 1. That upon a petition of not less than twenty-five residents and fruit growers of any county in this State, the county court of said county shall appoint a county inspector, whose duty it shall be to inspect the apple and other fruit orchards of said county, and to enforce the laws now in force and that may be hereafter in force in this State, applicable to the fruit industry and to the growing, handling, and selling of fruit, fruit trees, and other nursery stock; provided, that the inspector so to be appointed shall be recommended and certified to be competent for such position by the State District Commissioner of the State Board of Horticulture for the said county, and said county inspector shall hold his office during the pleasure of said county court.

Section 2. It shall be the duty of the State District Commissioner to instruct and educate the county inspectors as to the laws and quarantine regulations of this State, and the rules and regulations of the State Board of Horticulture. The county inspector shall perform his duties under the general supervision of the State District Commissioner for said county, to whom he shall make reports in the manner prescribed by the State Board of Horticulture.

Section 3. Such county inspector shall be paid for his services, by the said county, a sum not exceeding three dollars per day and pay his own personal expenses, for each and every day actually employed in the performance of his duties as herein provided, and the said county inspector shall report monthly to the said State District Commissioner the time for which he is entitled to pay during the month next preceding, and the said State District Commissioner shall certify the same to the county court before such compensation shall be paid to said county inspector.

Section 4. If any county for any reason fails to appoint a county inspector as herein provided, then the inspector of any adjacent county may perform such services, and his compensation and the necessary expenses incurred in the performance of his duty shall be charged against the county where the service is performed, as if he had been appointed by the county court of said county.

Section 5. The State District Commissioner of Horticulture shall hear and promptly decide all appeals from the county inspector in his district, and his decision shall have full force and effect until set aside by the courts of the State. All appeals from county inspectors to the district commissioners shall be under the form and regulations as prescribed by the State Board of Horticulture.

Section 6. That section 4178 of the Codes and Statutes of Oregon, as compiled and annotated by C. B. Bellinger and William W. Cotton, be and the same is hereby amended to read as follows:

Sec. 4178. Said Board shall employ without their number a secretary, who shall exercise the powers and discharge the duties conferred upon him by this act, and whose compensation shall not exceed $100 per month, to be paid in the same manner as other State officers. Said Board shall also elect from their own number a treasurer. Before entering upon the discharge of his duties, each member of the Board shall make and subscribe an oath to support the Constitution of the United States and of the State of Oregon, and to diligently, faithfully, and impartially discharge the duties of his office, which said oaths shall be filed with the secretary. The secretary shall make and subscribe a like oath, which shall be filed with the treasurer of the Board.

Section 7. That section 4185 of the Codes and Statutes of Oregon, as compiled and annotated by C. B. Bellinger and William W. Cotton, be and the same is hereby amended to read as follows:

Sec. 4185. It shall be the duty of the several members of the Board and of the secretary or the county inspectors under their direction, whenever they shall deem it necessary, to cause an inspection to be made of any orchards, nurseries, trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom, or any other place within their districts, and if found infested with any pests, diseases, or fungous growth injurious to fruits, plants, vegetables, trees, or vines, or with their eggs or larvae liable to spread to other places or localities, or of such nature as to be a public danger, they shall notify the owner or owners or persons in charge of or in possession of such articles, things or places that the same are so infested, and shall require said persons to eradicate or destroy said insects or pests, or their eggs or larvae, or to treat such contagious diseases within a certain time to be specified in said notice. Said notice may be served upon the person or persons, or any of them, owning, having charge, or having possession of such infested place, article, or thing, by any member of the Board or by the secretary thereof, or by any person deputed by said Board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruit, or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or in the property of any non-resident or any property not in the possession of any person and the owner or owners of which can not be found by the resident member of the Board or the secretary or county inspector after diligent search within the district, it shall be the duty of the Board or the member thereof in whose district the nuisance shall exist, or the secretary or county inspector under his or their directions, to cause such nuisance to be at once abated by eradicating or destroying said insects or pests or their eggs or larvae, or by treating or disinfecting or destroying the infested or diseased articles. The expense thereof shall be a county charge and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid shall be and become a lien on the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises, which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situate, by the district attorney in the name and for the benefit of the county making such payment or payments.

The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court and the proceeds applied in like manner. The Board is hereby invested with the power to cause such nuisance to be abated in a summary manner.

Filed in the office of the Secretary of State February 22, 1905.

An act to prevent the false branding or marking of, or false representation with reference to fruits grown in the State of Oregon, or elsewhere, and to provide penalties for the violation thereof.

Be it enacted by the People of the State of Oregon:

Section 1. Any person, firm, association or corporation engaged in growing, selling or packing green fruits of any kind within the State of Oregon, shall be required, upon packing any such fruit for market, whether intended for sale within or without the State of Oregon, to stamp, mark or label plainly on the outside of every box or package of green fruit so packed, the name and postoffice address of the person, firm, association, or corporation packing the same; provided further, that when the grower of such fruit be other than the packer of the same, the name and postoffice address of such grower shall also prominently appear upon such box or package as the grower of such fruit.

Section 2. It shall be unlawful for any dealer, commission merchant, shipper or vender, by means of any false representations whatever, either verbal, printed or written, to represent or pretend that any fruits mentioned in Section 1 of this act, were raised, produced or packed by any person or corporation, or in any locality, other than by the person or corporation, or in the locality where the same were in fact raised, produced or packed, as the case may be.

Section 3. If any dealer, commission merchant, shipper, vender or other person, shall have in his possession any of such fruits so falsely marked or labeled contrary to the provisions of Section 1 of this act, the possession by such dealer, commission merchant, shipper, vender, or other person, of any such fruits so falsely marked or labeled shall be prima facie evidence that such dealer, commission merchant, shipper, vender or other person, has so falsely marked or labeled such fruits.

Section 4. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine of not less than $5, nor more than $500, or by imprisonment in the county jail not less than ten nor more than one hundred days, or by both such fine and imprisonment, at the discretion of the court.

Approved by the Governor, February 7, 1907.

Filed in the office of the Secretary of State, February 7, 1907.

An act declaring it unlawful for nurserymen, or anyone dealing in, or selling fruit trees, or their agents, to sell and deliver to the purchaser thereof, trees and nursery stock, that is not of the same variety as represented by the nursery, or nurseryman, salesman of nursery stock, or agents therefor.

Be it enacted by the People of the State of Oregon:

Any person selling nursery stock, or young trees, and representing the same to be of a variety different from what said nursery stock of trees actually are, shall be required to replace all such trees with stock of the same grade and variety as the original order and shall be required to make reasonable compensation to the purchaser for expenses and loss of time due to such error having been made.

Filed in the office of the Secretary of State, February 10, 1907.

An act to amend sections 3 and 7 of an act entitled "An act to provide for the appointment of county fruit inspectors, and to amend sections 4178 and 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton," referring to the appointment of county fruit inspectors, filed in the office of the Secretary of State, February 22, 1905.

Be it enacted by the People of the State of Oregon:

Section 1. That section 3 of an act entitled "An act to provide for the appointment of county fruit inspectors, and to amend sections 4178 and 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton," passed at the twenty-third regular session of the Legislative Assembly of the State of Oregon, and filed in the office of the Secretary of State, February 22, 1905, be and the same is hereby amended to read as follows:

Sec. 3. Such county inspector shall be paid for his services, by the said county, a sum not exceeding three dollars per day, and shall be reimbursed for his actual cash outlay for team hire and railway fares for each and every day actually employed in the performance of his duties as herein provided, and the said county inspector shall report monthly to the said State District Commissioner the time for which he is entitled to pay during the month next preceding, and also a statement of his own personal expenses while engaged in the performance of his duty as such county inspector during said month, and shall also file vouchers showing expenditures for such personal expenses, and the said State District Commissioner shall certify the same to the county court before such compensation and personal expenses shall be paid to said county inspector.

Section 2. That section 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton, and amended by section 7 of an act entitled "An act to provide for the appointment of county fruit inspectors, and to amend sections 4178 and 4185 of the Codes and Statutes of Oregon, as compiled and annotated by Charles B. Bellinger and William W. Cotton," passed at the twenty-third regular session of the Legislative Assembly of the State of Oregon, and filed in the office of the Secretary of State, February 22, 1905, be and the same is hereby amended to read as follows:

Sec. 4185. It shall be the duty of the several members of the Board and of the secretary or the county inspectors under their direction, whenever they shall deem it necessary to cause an inspection to be made of any orchards, nurseries, trees, plants, vegetables, vines, or any fruit packing house, storeroom, salesroom or any other place within their district, and also of any fruit trees or nursery stock shipped from beyond the limits of this State, and if found infected with any pests, diseases or fungous growth injurious to fruits, plants, trees, vegetables, or vines, or with their eggs or larvae liable to spread to other places or localities, or of such nature as to be a public danger, they shall notify the owner or owners or persons in charge of or in possession of such articles, things or places, that the same are so infested, or in case such fruit trees or nursery stock, although apparently sound and not infested by any pest, shall have been from an infested district beyond the limits of this State, they shall also notify the owner or owners or persons in charge of or in possession of the same, and shall require said persons to eradicate or destroy said insects or pests or their eggs or larvae, or such imported fruit trees or nursery stock of infested districts without the limits of the State, or to treat such contagious diseases within a certain time to be specified in said notice. Said notice may be served upon the person or persons, or any of them, owning, having charge, or having possession of such infested place, article, or thing, by any member of the Board or by the secretary thereof,

or by any person deputed by said Board for that purpose, or they may be served in the same manner as a summons in an action at law. Such notice shall contain directions for the application of some treatment approved by the commissioners for the eradication or destruction of said pests, or the eggs or larvae thereof, or the treatment of contagious diseases or fungous growths. Any and all such places, orchards, nurseries, trees, plants, shrubs, vegetables, vines, fruit, or articles thus infested are hereby declared to be a public nuisance; and whenever any such nuisance shall exist at any place in the State on the property of any owner or owners upon whom or upon the person in charge or possession of whose property notice has been served as aforesaid, and who shall have failed or refused to abate the same within the time specified in such notice, or in the property of any non-resident or any property not in the possession of any person and the owner or owners of which can not be found by the resident members of the Board or the secretary or county inspector after diligent search within the district, it shall be the duty of the Board or the member thereof in whose district the nuisance shall exist, or the secretary or county inspector under his or their directions, to cause such nuisance to be at once abated by eradicating or destroying said insects or pests or their eggs or larvae, or by treating or disinfecting or destroying the infested or diseased articles, or imported fruit trees or nursery stock imported from an infested district without the limits of this State. The expense thereof shall be a county charge and the county court shall allow and pay the same out of the general fund of the county. Any and all sums so paid shall be and become a lien on the property and premises from which said nuisance shall have been removed or abated, in pursuance of this act, and may be recovered by a suit in equity against such property or premises, which suit to foreclose such liens shall be brought in the circuit court of the county where the premises are situate, by the district attorney in the name and for the benefit of the county making such payment or payments.

The proceedings in such cases shall be governed by the same rules, as far as may be applicable, as suits to foreclose mechanics' liens, and the property shall be sold under the order of the court and the proceeds applied in like manner. The Board is hereby invested with the power to cause such niusances to be abated in a summary manner.

Filed in the office of the Secretary of State, February 19, 1907.

QUARANTINE REGULATIONS

At a special meeting of the Oregon State Board of Horticulture, held in Portland, April 2, 1895, all members present, the following regulations were adopted, in accordance with the laws regulating such matters, and are, therefore, binding upon all persons:

Rule 1.—All consignees, agents, or other persons, shall, within twenty-four hours, notify the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, of the arrival of any trees, plants, buds, or scions, at the quarantine station in the district of final destination.

Rule 2.—All trees, plants, cuttings, grafts, buds, or, scions imported or brought into the State from any foreign country or from any of the states or territories, are hereby required to be inspected upon arrival at the quarantine station in the district of final destination; and if such nursery stock, trees, plants, cuttings, grafts, buds, or scions are found to be free of insect pests and fungous diseases, the said quarantine officer or duly commissioned quarantine guardian shall issue a certificate to that effect; and, furthermore, if any of said trees, plants, cuttings, grafts, buds, or scions are found infected with insect pests, fungi, blight, or other diseases injurious to fruit or to fruit trees, or other trees or plants, they shall be disinfected and remain in quarantine until the quarantine officer of the State Board of Horticulture or the duly commissioned quarantine guardian can determine whether the said trees, plants, cuttings, grafts, buds, or scions are free from live, injurious insect pests or their eggs, larvae or pupae or fungous diseases before they can be offered for sale, gift, distribution, or transportation. All persons or companies are hereby prohibited from carrying any trees, plants, cuttings, grafts, buds, or scions from without the State to any point within the State beyond the nearest point on its line or course to the quarantine station in the district of ultimate destination; or from any point within the State to any point therein, until such trees, plants, cuttings, grafts, buds, or scions have been duly inspected, and, if required, disinfected as hereinbefore provided; and all such shipments must be accompanied by the proper certificate of the inspecting officer; provided, however, that after such persons or company have given the proper officer four days' notice, he or they shall not be required to hold such shipments further, without the direction from such officer.

Rule 3.—All peach, nectarine, apricot, plum, or almond trees, and all other trees budded or grafted upon peach stocks or roots, all peach or other pits, and all peach, nectarine, apricot, plum, or almond cuttings, buds, or scions, raised or grown in a district where the "peach yellows" or the "peach rosette" are known to exist, are hereby prohibited from being imported into or planted or offered for sale, gift, or distribution within the State of Oregon.

Rule 4.—All trees, plants, cuttings, grafts, buds, scions, seeds, or pits arriving from any foreign country found infected with insect pests or their eggs, larvae, or pupae, or with fungi, or other disease or diseases hitherto unknown in this State, are hereby prohibited from landing.

Rule 5.—Fruit of any kind grown in any foreign country, or in any of the states or territories, found infected with any insect or insects, or with any fungi, blight or other disease or diseases injurious to fruit or fruit trees, or to other trees or plants, is hereby prohibited from being offered for sale, gift of distribution within the State.

Rule 6.—Any boxes, packages, packing material, and the like, infected with insect or insects, or their eggs, larvae or pupae, or by any fungi, blight, or other disease or diseases known to be injurious to fruit or to fruit trees, or to other trees or plants, and liable to spread contagion, are hereby prohibited from being offered for sale, gift, distribution, or transportation until said material has been disinfected by dipping it in boiling water and allowing it to remain in said boiling water not less than two minutes; such boiling water used as such disinfectant to contain, in solution, one pound of concentrated potash to each and every ten gallons of water.

Rule 7.—All trees, plants, grafts, cuttings, buds, or scions may be disinfected by dipping in a solution of three-fourths of a pound of whale-oil soap (80 per cent) to each and every gallon of water: said whale-oil soap solution shall be kept at a temperature of 100 to 150 degrees. Said trees, plants, cuttings, grafts, buds, or scions shall remain in said solution not less than two minutes. After said trees, plants, cuttings, grafts, buds, or scions have been disinfected, they shall remain in quarantine fourteen days unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by the quarantine officer of the State Board of Horticulture, or a duly commissioned quarantine guardian, for further disinfection.

Rule 8.—All trees, plants, cuttings, grafts, buds, or scions may be disinfected by fumigation with hydrocyanic acid gas, as follows: Said trees, plants, cuttings, grafts, buds, or scions shall be covered with an air-tight tent or box, and for each and every 100 cubic feet of space therein one ounce of (C. P.) cyanide of potassium (98 per cent), one fluid ounce of sulphuric acid, and two fluid ounces of water shall be used. The cyanide of potassium shall be placed in an earthenware vessel, the water poured over the said cyanide of potassium, afterward adding the sulphuric acid, and the tent or box to be immediately closed tightly, and allowed to remained closed for not less than forty minutes. After said trees, plants, cuttings, grafts, or scions have been treated with hydrocyanic acid gas as above directed, they shall remain in quarantine for fourteen days, unless otherwise directed by the inspecting officer, for subsequent inspection, and if deemed necessary by a member of the State Board of Horticulture, or the quarantine officer of said Board, or a duly commissioned quarantine guardian, for subsequent disinfection.

Rule 9.—All trees, plants, cuttings, grafts, buds or scions imported or brought into the State shall be inspected upon arrival at the quarantine station in the district of final destination, and if found infected with any injurious insects or diseases which can not be destroyed by the remedies required in rules 7 and 8 of these regulations, are hereby prohibited from being planted or offered for sale, gift, or distribution, and shall be proceeded against as a nuisance.

Rule 10.—If any person or persons having in their possession trees, plants, cuttings, grafts, buds, scions, seeds, or pits infected with an insect or insects, or with any fungi, blight or other disease or diseases injurious to fruit trees, or to any other trees or plants, shall refuse or neglect to disinfect the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits as is required by Rules 7 and 8 of these regulations, after having been notified to do so by a member of the State Board of Horticulture, the quarantine officer of said Board, or a duly commissioned quarantine guardian, the said trees, plants, cuttings, grafts, buds, scions, seeds, or pits shall be declared a public nuisance, and shall be proceeded against as provided by law.

Rule 11.—Animals known as flying fox, Australian or English wild rabbits, or other animals or birds detrimental to fruit or fruit trees, plants,

etc., are prohibited from being brought or landed in this State, and, if landed, shall be destroyed.

Rule 12.—Quarantine stations: For the First District, comprising the counties of Multnomah, Clackamas, Yamhill, Washington, Columbia, Clatsop and Tillamook, shall be Portland. W. K. Newell, quarantine officer, or any member of the Board or the secretary thereof. For the Second District, comprising the counties of Marion, Polk, Benton, Linn, Lincoln and Lane, shall be Salem. L. T. Reynolds, quarantine officer, or any member of the Board or the secretary thereof. For the Third District, comprising the counties of Josehine, Coos, Curry, Douglas, Jackson, Lake and Klamath, shall be Ashland. A. H. Carson, quarantine officer, or any member of the Board or the secretary thereof. For the Fourth District, comprising the counties of Morrow, Wasco, Gilliam, Crook and Sherman, shall be The Dalles. Emile Schanno, quarantine officer, or any member of the Board or the secretary thereof. For the Fifth District, comprising the counties of Umatilla, Union, Baker, Wallowa, Malheur, Grant and Harney, shall be Milton and Pendleton. Judd Geer, quarantine officer, or any member of the Board or the secretary thereof. At all stations such other quarantine officers as may be from time to time appointed by the Board, notice whereof will be given, and complete lists of whom may be obtained from the secretary or any member of the Board.

Rule 13.—Importers or owners of nursery stock, trees or cuttings, grafts, buds, or scions, desiring to have such nursery stock, trees, plants, cuttings, grafts, buds or scions inspected at points other than regular quarantine stations, may have such inspection done where required; provided, however, that such importers shall pay all charges of inspection; such charges and expenses to be paid before a certificate is granted. Transportation companies or persons and consignees or agents shall deliver and cause to be detained all nursery stock, trees, plants, and fruit at one or the other of the quarantine stations, for inspection, as provided by the rules and regulations of the Board.

Rule 14.—The fee for the inspection of apple, pear, plum, peach, nectarine, prune, cherry, apricot, nut-bearing trees and all other trees, shrubs, or plants, shall be as follows: Thirty cents per hour, including the time from leaving home, inspection and return home of the inspector, and actual traveling and other expenses. On all fruits the fee for inspection shall be $1 on any sum up to $35, and $2 on any sum over that amount, and $5 for carload lots.

Rule 15.—All persons growing nursery stock, trees, and plants for sale, or to be offered for sale, are hereby required to report to the commissioner of the district in which said nursery stock, trees, or plants are grown, for inspection during the months of September, October, or November of each and every year, and the commissioner of such district, or his duly appointed deputy shall inspect such nursery stock, trees, or plants prior to shipment and delivery. When said nursery stock, trees or plants are found by said inspecting officer to be worthy of a certificate setting forth the freedom of such nursery stock, trees, or plants, from live, injurious insect pests, their eggs, larvae, pupae, or fungous disease the said inspecting officer shall then issue to the owner or owners of said nursery stock, trees, or plants, a certificate of inspection. The condition under which this certificate is granted is, that the party or parties receiving such certificate shall be compelled to disinfect by fumigation with hydrocyanic acid gas, as described in Rule 8, all pear and apple trees, or other stock grown on apple roots, after lifting the same and before delivery to purchaser or carriers; and, in case such fumigation is neglected, said certificate of inspection shall be void and of no effect.

Passed at a meeting of the State Board of Horticulture at Portland, Oregon, April 3, 1895, and amended at a regular meeting of the State

Board of Horticulture at Salem, Oregon, October 15, A. D. 1895.

At a regular meeting of the Oregon State Board of Horticulture, held October 14, 1907, Rule 8 of the Quarantine Regulations of the State Board of Horticulture was amended so as to read as follows:

All trees, plants, grafts, buds or scions grown in the State of Oregon and offered for sale within the State, and all such trees, plants, grafts, buds and scions grown out of the State of Oregon, and sold within the State for planting and propagation, shall be disinfected either with hydrocyanic acid as follows: Said trees, plants, cuttings, grafts, buds or scions shall be covered with an air-tight box or house, and for each and every 100 cubic feet of space therein one ounce of chemically pure cyanide of potassium (93 per cent), one fluid ounce of sulphuric acid and two ounces of water shall be used. The cyanide of potassium shall be placed in an earthenware vessel, the water poured over the said cyanide of potassium, afterward adding the sulphuric acid, when the box or house must be immediately closed tightly and allowed to remain closed for not less than forty minutes, or instead of such fumigation such trees, buds or scions may be dipped in a standard solution of lime and sulphur of the strength required for winter use in spraying San Jose scale.

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